

Issue No. : 1  
Issue Date : December 2010  
Project No. : 912

**PROVISION OF CREMATORS AT  
WO HOP SHEK CREMATORIUM**

**QUARTERLY ENVIRONMENTAL  
MONITORING & AUDIT REPORT  
(MAY 2010 – JULY 2010)**

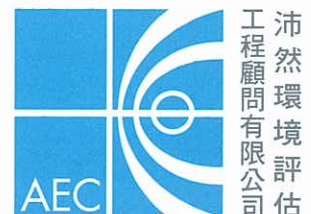
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**COMMERCIAL-IN-CONFIDENCE**

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Your reference:

Our reference: HKASD101/50/100602

Date: 3 December 2010

Attn.: Mr Andrew NAM / Ms Salina LEE

**BY FAX ONLY**  
(Fax no.: 2524 7981)

Dear Sirs

Quotation Contract No. 9/2009/AB1  
Provision of Cremators at Wo Hop Shek Crematorium - Independent Environmental Checker Service  
Quarterly EM&A Report (May 2010 – July 2010)

We refer to your e-mail from your Environmental Team attaching a copy of the quarterly EM&A report (May 2010 – July 2010) on 2 December 2010. We have no comment and, hereby, endorse the report.

Should you have any queries, please do not hesitate to contact our Mr James Choi on 2869 6018.

Yours faithfully  
EDMS CONSULTING LTD

Andy W L Chung  
Independent Environmental Checker

AC/yl

cc AEC – Ms Grace Kwok (Fax: 2815 5399)

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Certified by:

  
\_\_\_\_\_  
Grace M. H. Kwok  
Environmental Team Leader

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## **PROVISION OF CREMATORS AT WO HOP SHEK CREMATORIUM**


### **QUARTERLY ENVIRONMENTAL MONITORING & AUDIT REPORT (MAY 2010 – JULY 2010)**

Prepared By:

**ALLIED ENVIRONMENTAL CONSULTANTS LTD.**

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We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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## **EXECUTIVE SUMMARY**

Allied Environmental Consultants Limited (AEC) has been appointed to conduct an environmental monitoring and audit (EM&A) program for the Provision of Cremators at Wo Hop Shek Crematorium (the “Project”). The construction works of the Project commenced on 1<sup>st</sup> November 2009. This report is the third quarterly EM&A report, which summarizes the environmental monitoring and audit results recorded during the period from 1<sup>st</sup> May 2010 to 31<sup>st</sup> July 2010.

Based on the monitoring results, the air quality and construction noise levels during the reporting period complied with the environmental requirements in EM&A Manual. There were no environmental complaints received in this reporting quarter. No notification of summons or prosecution was received.

Construction activities to be undertaken in August 2010 include construction of retaining wall; site drainage works and backfilling; excavation for the Area 2 and construction of the cremator plant room. Potential environmental impacts include dust generation from drilling, material transfer, demolition works, vehicular movement, stockpile of excavated materials; noise from erection of tower crane and demolition and construction of RC structure; wastewater generated from spraying water; and generation of various wastes including C&D and chemical wastes. The Contractor should properly implement environmental mitigation measures as per the implementation schedule in the EM&A manual to ensure no adverse environmental impacts to be arisen from the construction works. The Contractor is also reminded to maintain good housekeeping at the site.

## 1. PROJECT BACKGROUND

The existing Wo Hop Shek Crematorium is a coffin crematorium with two twin cremators. A skeletal cremator building with a single cremator operates nearby for the cremation of skeletal remains from burial. The skeletal cremator and the coffin cremators were commissioned in the 1960's and 1991 respectively.

As the five existing cremators had approached the end of their serviceable life, the Food and Environmental Hygiene Department (FEHD) proposed to demolish the existing coffin crematorium and the skeletal cremator building and to construct in-situ a new crematorium in the same site.

An Environmental Impact Assessment (EIA) was carried out for the Provision of Cremators at Wo Hop Shek Crematorium (hereafter referred to as the "Project") and the EIA Report was approved by Environmental Protection Department (EPD) in June 2008. The Environmental Permit (EP-329/2009) for the Project was issued by EPD in February 2009.

The locations of project site and air sensitive receivers are shown in **Figure 1**. The construction phase is divided in the three phases as outlined below:

### Phase I (Year 2009 to Year 2011)

Construction works include the demolition of the existing coffin crematorium building, transformer room and pump room and provision of five new coffin cremators, one dual-purpose cremator, one new skeletal cremator, one cremation plant room with sufficient space for housing nine single cremators and other ancillary facilities such as service halls. The new crematorium will provide seven cremators upon completion of Phase I.

### Phase II (Year 2012)

The existing skeletal cremator building will be demolished upon completion of Phase I (i.e. there will be no overlapping between Phases I and II).

### Phase III: Future Expansion Phase (for completion by around 2014)

Two additional cremators and one additional service hall will be provided upon completion of Phase II to allow future expansion.

In July 2009, Architectural Services Department (ArchSD) as the works agent has awarded the construction contract of the Project to Wan Chung Construction Co. Ltd. ("the Contractor"). The Contractor has appointed Allied Environmental Consultants Limited (AEC) as the Environmental Team (ET) to undertake Environmental Monitoring and Audit (EM&A) programme in accordance with the EM&A Manual under the approved EIA report, which details the EM&A requirements for the construction and operation of the Project, and the EP-329/2009.

The Construction Programme of the Project is shown in Appendix A. The construction works commenced on 1<sup>st</sup> November 2009. This report is the third quarterly EM&A report, which details the EM&A results recorded during the period from 1<sup>st</sup> May 2010 to 31<sup>st</sup> July 2010.



## 1.1 Project Organization and Contact Personnel

Key personnel and contact particulars are summarized in *Table 1*.

Role	Department / Company	Names	Contact Number	Fax Number
Environmental Permit Holder	Food and Environmental Hygiene Department	Ms. Karen Sin	3141 1226	3101 0450
Architect	Architecture Services Department	Mr. Andrew Nam	2867 3662	2290 2170
Main Contractor	Wan Chung Construction Co., Limited	Mr. Sunny Ngan Mr. Frank So	9491 9058 9863 6587	2676 7966
Environmental Team Leader	Allied Environmental Consultants Limited	Mr. Adi Lee	2815 7028	2815 5399
Independent Environmental Checker	EDMS Consulting Limited	Mr. Andy Chung	2869 6018	3007 8556

**Table 1 Contact Details of Key Personnel**

## 2. CONSTRUCTION WORKS & PROGRAMME

The major works undertaken and/or completed during the reporting period are listed below:

- Construction of retaining wall;
- Site backfilling at the stockpile area;
- Delivery of excavated material to the recycled aggregates factory;
- Site drainage works;
- Drainage diversion works;
- Excavation for the underground drainage system;
- Excavation for the cremator plant room;
- Excavation for Area 2;
- Erection of tower crane;
- Demolition of RC structure; and
- Construction of the cremator plant room.

*Figure 2* shows the works undertaken during the reporting period and *Table 2* shows the interrelationship between construction activities and environmental mitigation measures in the reporting period.

<b>Construction Works</b>	<b>Major Environmental Impact</b>	<b>Mitigation Measures</b>
Construction of Retaining wall	Construction dust, construction noise and Water Quality Impact.	<ol style="list-style-type: none"> <li>1. Watering and imperious sheeting should be provide to dusty materials from drilling, inclusive of materials transfer;</li> <li>2. Water spraying should be provide to haul road and demolition works;</li> <li>3. Dust emission from stockpile of excavated materials should be covered by imperious sheeting; and</li> <li>4. Wastewater generated from spraying water should be well treated and recycled.</li> </ol>
Site backfilling at the stockpile area	Construction dust, construction noise and waste management.	Provide water spraying and imperious sheet to handling of debris material. Well-maintained and quiet plants were used. Trip record should maintain properly.
Delivery of excavated rock material to the recycled aggregates factory	Construction dust and waste management.	Trip record should maintain properly. Water spraying to load and unloading process.
Site Drainage Works	Construction dust and construction noise.	Water spraying to loading /unloading process and stockpile. Well-maintained and quiet plants were used.
Drainage Diversion Works	Construction dust and construction noise.	Water spraying to loading /unloading process and stockpile. Well-maintained and quiet plants were used.
Excavation for the underground drainage system	Construction dust, construction noise and waste management.	Provide water spraying and imperious sheet to handling of debris material. Well-maintained and quiet plants were used. Trip record should maintain properly.
Excavation for the cremator plant room	Construction dust, construction noise and waste management.	Provide water spraying and imperious sheet to handling of debris material. Well-maintained and quiet plants were used. Trip record should maintain properly.

**Table 2 Interrelationship between Construction Activities and Mitigation Measures**

Construction Works	Major Environmental Impact	Mitigation Measures
Excavation for Area 2	Construction dust, construction noise and waste management.	Provide water spraying and imperious sheet to handling of debris material. Well-maintained and quiet plants were used. Trip record should maintain properly.
Erection of tower crane	Construction noise.	Well-maintained and quiet plants were used.
Demolition of RC structure	Construction dust, construction noise and waste management.	Provide water spraying and imperious sheet to handling of debris material. Well-maintained and quiet plants were used. Trip record should maintain properly.
Construction of the cremator plant room	Construction dust and construction noise.	Water spraying to loading /unloading process and stockpile. Well-maintained and quiet plants were used.

Table 2 (con't) Interrelationship between Construction Activities and Mitigation Measures

### 3. SUMMARY OF EM&A REQUIREMENT

For regular impact monitoring, the sampling frequency of at least once in every six-days, was strictly observed at the monitoring station for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days was undertaken when the highest dust impact occurs.

From baseline monitoring results, the Action and Limit Levels for air quality are summarized in *Table 3*.

Parameters	Monitoring Location	Baseline Level ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
24-Hour TSP Level	A22a	42.0	157.3	260
	A22b	41.6	157.0	260
1-Hour TSP Level	A22a	48.8	281.7	500
	A22b	46.8	280.4	500

Table 3 Action and Limit Level for Air Quality Impact Monitoring

Should non-compliance of the above Action and Limit levels occurs, actions in accordance with the Event and Action Plan in **Table 4**.

Event	Action			
	ET	IEC	AR	Contractor
<b>Action Level</b>				
Exceedance for one sample	1. Identify source, investigate the causes of complaint and propose remedial measures; 2. Inform IEC and AR; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and AR; 3. Advise the AR on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and AR; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to AR within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
<b>Limit Level</b>				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, AR, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC,	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the AR on the effectiveness of the proposed remedial measures;	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action			
	ET	IEC	AR	Contractor
	EPD and AR informed of the results.	5. Supervise implementation of remedial measures.		
Exceedance for two or more consecutive samples	1. Notify IEC, AR, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and AR to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and AR informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst AR, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the AR accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the AR until the exceedance is abated

Table 4 Event and Action Plan

## 4. AIR QUALITY MONITORING

### 4.1 Air Quality Monitoring Methodology

TSP levels in 1-hour and 24-hour were measured to indicate the impacts of construction dust on air quality. TSP levels were measured by following the standard high volume sampling (HVS) method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50). 1-hour TSP samples were taken three times a day between 0700-1900 hours. 24-hour TSP samples were taken every six days.

### 4.2 Monitoring Equipment

High Volume Sampler (HVS) in compliance with the specifications of section 2.2.1 of the EM&A Manual was used for carrying out the 1-hour and 24-hour TSP monitoring at the designated location. The model number of the HVSs is Anderson GMWS-2310 ACCU-VOL.

The HVSs are equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. The flow rate of each HVS with mass flow controller is calibrated using an orifice calibrator. Initial calibration of dust monitoring equipment is

conducted upon installation and prior to commissioning. Five point calibration is carried out every six months. The Calibration Certificates of the High-Volume TSP Sampler are given in **Appendix A**. The weighing of the filter paper was undertaken by SGS Hong Kong Limited.

Wind data monitoring equipment was set up on 30 November 2009 and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. Installation and operation of wind data monitoring equipment followed the followings:

- Wind sensors were installed on masts at an elevated level 10m above ground so that they are clear of obstructions of turbulence caused by the buildings;
- The wind data were captured by a data logger and to be downloaded for processing at least once a month;
- The wind data monitoring equipment shall be re-calibrated at least once every six months; and
- Wind direction is divided into 16 sectors of 22.5 degrees each.

Weather data were obtained from the on-site wind stations in the reporting period.

### 4.3 Air Quality Monitoring Location

1-hour and 24-hour TSP monitoring were conducted to monitor the air quality. Air quality monitoring were conducted at two designated air quality monitoring locations during construction phase: (i) 83 Wo Ka Lau Road (A22a) and (ii) 51D Wo Hop Shek San Tsuen (A22b) as shown in **Figure 2**. Details of the two air quality monitoring stations are shown in **Table 5**.

ID	Monitoring Location	Description of Monitoring Location
A22a	83 Wo Ka Lau Road	G/F at the front gate of 83 Wo Ka Lau Road
A22b	51D Wo Hop Shek San Tsuen	G/F boundary wall of house 51D of Wo Hop Shek San Tsuen

**Table 5** Descriptions of Air Quality Monitoring Locations

## 5. RESULTS

### 5.1. Air Quality

No exceedance was recorded in this quarter. Summary and graphical plots of air quality monitoring record of 1-hour TSP levels and 24-hour TSP levels are given in **Appendix B and Appendix C**.

## 5.2. Weather Conditions

Weather data were obtained from the on-site wind stations in the reporting period. **Table 6** summarizes the wind data during the monitoring dates. Wind data records from the on-site wind stations are shown in **Appendix D**.

Date	Weather	Prevailing Wind Direction	Daily Average Wind Speed (m/s)
6 May 2010	Fine	N	0.14
12 May 2010	Cloudy	SW	0.18
18 May 2010	Sunny	SW	0.08
24 May 2010	Sunny	SW	0.21
29 May 2010	Cloudy	NW	0.08
4 June 2010	Cloudy	E	0.28
10 June 2010	Rainy	SE	0.24
15 June 2010	Cloudy	N	0.10
21 June 2010	Fine	N	0.15
26 June 2010	Rainy	NW	0.15
2 July 2010	Sunny	N	0.13
8 July 2010	Fine	NE	0.18
14 July 2010	Sunny	SE	0.18
20 July 2010	Fine	SE	0.21
26 July 2010	Fine	SE	0.15
31 July 2010	Fine	NE	0.10

**Table 6 Summary of Weather Conditions during the Monitoring Period**

## 6. SITE INSPECTION & AUDIT

Weekly site inspections were carried out by representatives of the ET. A total of thirteen site inspections were conducted by the ET in this reporting period. Observations by the ET, actions by the Contractor and outcome are summarized in the **Table 7**.

Date	Observations	Action taken by Contractor	Outcome
7 May 2010	Perimeter u-channel was filled with excess water and it is muddy.	Clean up the perimeter u-channel.	The situation was rectified as observed on 13 May 2010 (Closed).
	Excavated area was filled with excess water.	Provide pumps to remove excess water,	
13 May 2010	Sump pit was fully filled with water.	Remove wastewater.	The situation was rectified as observed on 20 May 2010 (Closed).
	Dust and muddy water was observed around the site entrance.	Remove dust and muddy water around the site entrance.	

Date	Observations	Action taken by Contractor	Outcome
20 May 2010	Stagnant water was observed on-site.	Remove stagnant water	The situation was rectified as observed on 27 May 2010 (Closed).
27 May 2010	Construction works at the west portion of the site were found dusty.	Provide water during construction works, excavation and vehicle movements.	The situation was rectified as observed on 3 June 2010 (Closed).
	Stockpile at the centre of site appeared dry.	Provide sufficient watering to the stockpile.	
3 June 2010	No major environmental deficiency.	N/A	N/A
11 June 2010	Dusty operation from cement mixing works was observed on site.	Proper enclosure has been provided.	The situation was rectified as observed on 17 June 2010 (Closed).
17 June 2010	The designated road and a small area of exposed ground appeared dry.	Provide sufficient watering.	The situation was rectified as observed on 25 June 2010 (Closed).
	The waste materials storage area was not properly banded.	Proper bunding has been provided to the materials storage area.	The situation was rectified as observed on 25 June 2010 (Closed).
	The chemical storage area was observed not accessible.	The chemical storage area was relocated to a accessible location.	The situation was rectified as observed on 25 June 2010 (Closed).
25 June 2010	Part of the exposed slope surface was not properly covered.	Exposed slope surface was properly covered.	The situation was rectified as observed on 8 July 2010 (Closed).
	Accumulation of general refuse at the center and western portion of the site.	General Refuse has been removed from site.	The situation was rectified as observed on 2 July 2010 (Closed).
2 July 2010	The sand bags near the open storm water drains were found damaged and it increased the possible of contamination of water in the open storm water drain.	The damaged sand bags near the open water drains were removed.	The situation was rectified as observed on 15 July 2010 (Closed).



Date	Observations	Action taken by Contractor	Outcome
8 July 2010	The unpaved site area appeared dry.	The unpaved site area was observed dampened.	The situation was rectified as observed on 15 July 2010 (Closed).
	The protected tree species, which were transplanted in area L1, appeared in an unhealthy condition.	The extra plantations at area L1 were removed as recommended by ecological auditor.	The situation was rectified as observed on 15 July 2010 (Closed).
15 July 2010	The construction materials and the C&D waste at the centre of the site were not segregated.	Sorting was provided and the construction materials and the C&D waste were segregated properly.	The situation was rectified as observed on 30 July 2010 (Closed).
22 July 2010	The site is filled by water due to adverse weather.	Dewatering through sedimentation tank and water treatment facilities was completed.	The situation was rectified as observed on 30 July 2010 (Closed).
30 July 2010	Water was accumulated at the western portion of site outside the retaining wall of the proposed building development.	Dewatering through sedimentation tank and water treatment facilities was completed.	The situation was rectified as observed on 5 August 2010 (Closed).
	The unpaved site area appeared dry.	The unpaved site area was properly watered.	The situation was rectified as observed on 5 August 2010 (Closed).
	General refuse was observed on the slope.	General refuse was removed and properly stored before disposed of.	The situation was rectified as observed on 5 August 2010 (Closed).

Table 7 Summary of Site Inspections

During site inspections in the reporting quarter, no non-conformance of implementation of environmental mitigation measures was identified. All environmental mitigation measures for construction stages as stated in approved EIA Report, EM&A Manual and EP-329/2009 were carried out properly in the reporting quarter.

## 7. LANDSCAPE AND VISUAL IMPACTS

A total of seven landscape and visual impact inspections were carried out on 7<sup>th</sup> and 20<sup>th</sup> May 2010, 11<sup>th</sup> and 25<sup>th</sup> June 2010 and 2<sup>nd</sup> 15<sup>th</sup> and 30<sup>th</sup> July 2010. In May and June 2010, the transplanted trees *Aquilaria sinensis* showed deterioration in health condition at transplanting

receptor site “T1”. Daily watering and closely monitoring is recommended. Besides, four individuals of *Juniperus chinensis* var. *kaizuca* seems infected with virus/fungi. In July, the transplanted trees *Aquilaria sinensis* showed deterioration in health condition at transplanting receptor site “T1”. Daily watering and closely monitoring is recommended.

## **8. NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

In this reporting quarter, no complaints, inspection notices, and notifications of summons or prosecution were received.

## **9. WASTE MANAGEMENT**

A total of 11,082.5 m<sup>3</sup> of inert C&D material was disposed to Tuen Mun Area 38 Fill Bank. 3.09 tonnes of metal wastes and 0.2275 m<sup>3</sup> of general refuse were disposed of to NENT Landfill. No chemical waste was generated in this reporting quarter.

## **10. RECOMMENDATIONS AND CONCLUSIONS**

### **10.1. Recommendations**

In accordance with the environmental site audits undertaken during the reporting quarter, the following recommendations are made:

- Excess water should be removed from the unpaved area / excavation area / sump pit;
- Muddy water and surface runoff should be cleaned up;
- Regular watering should be given to unpaved haul road and stockpile of dusty materials;
- Enclosure should be given for dusty operation and exposed slope surface;
- Proper bund should be given for waste storage area;
- The chemical storage area should be made accessible;
- Excess waste should be removed regularly to prevent from accumulation;
- Provide dewatering after rains;
- Damaged sandbags should be removed; and
- Better sorting of waste should be given on-site.

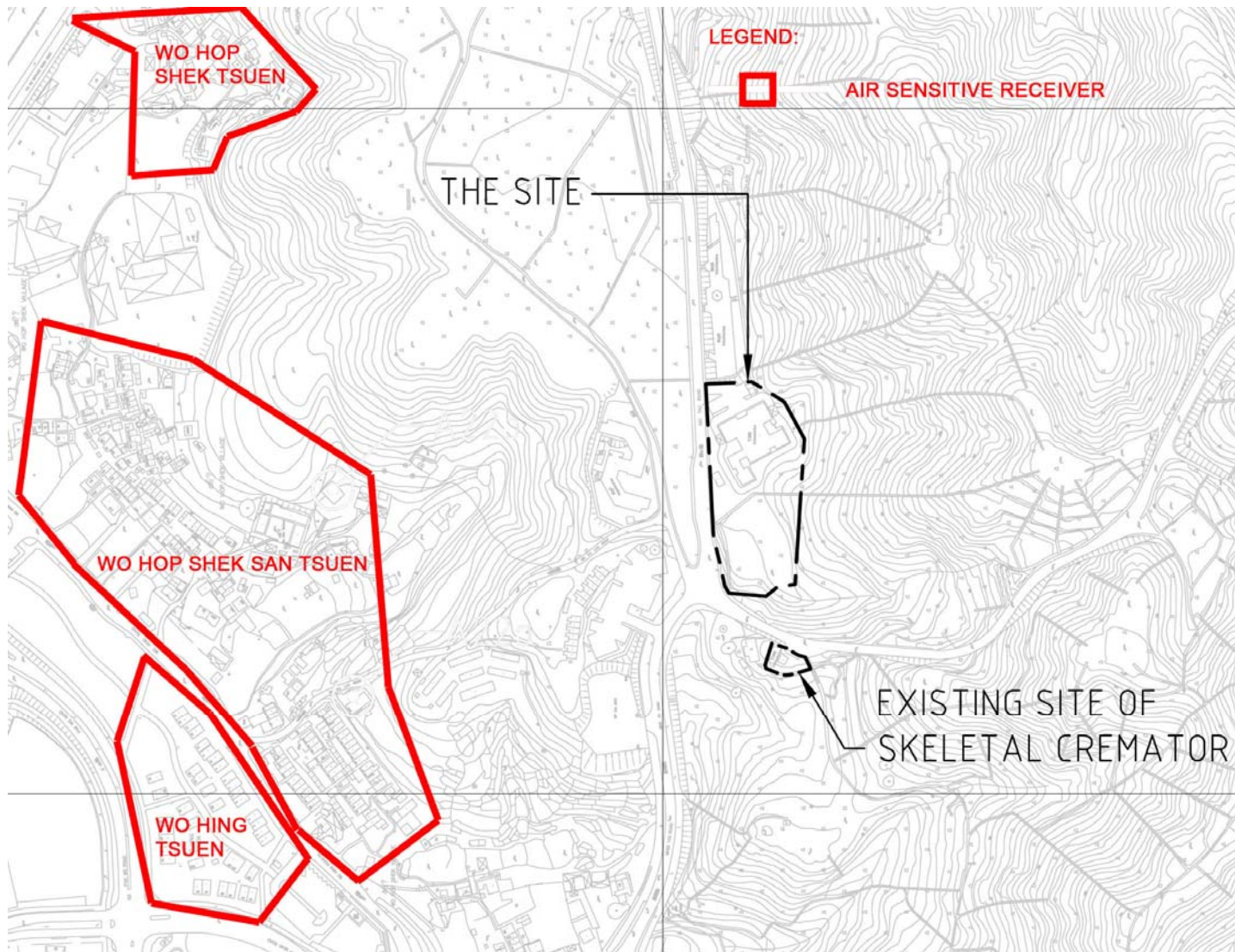
The ET will strictly follow the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

### **10.2. Conclusions**

Environmental monitoring was carried out for the Provision of Cremators at Wo Hop Shek Crematorium in the reporting period. 1-hour and 24-hour TSP air quality monitoring were

conducted at (i) 83 Wo Ka Lau Road (A22a) and (ii) 51D Wo Hop Shek San Tsuen (A22b) during the period from 1<sup>st</sup> May 2010 to 31<sup>st</sup> July 2010.

All monitoring results complied with the relevant action and limit levels. No environmental complaints and notification of summons or prosecution were received during the reporting period.



**PROVISION OF CREMATORS AT WO HOP SHEK CREMATORIUM AT KIU TAU ROAD**  
**SITE LOCATION PLAN**

Figure No.

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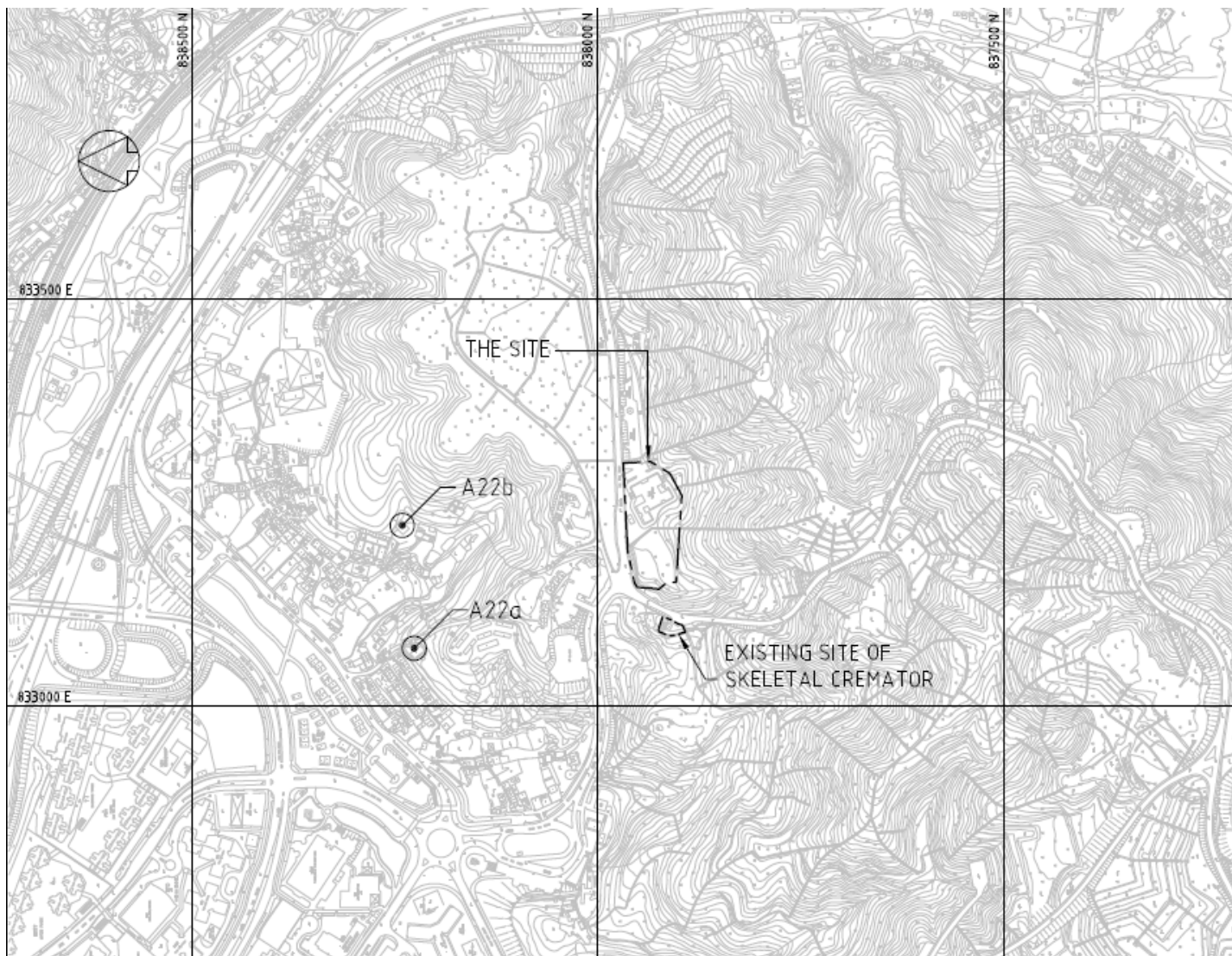
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**PROVISION OF CREMATORS AT WO HOP SHEK CREMATORIUM AT KIU TAU ROAD**  
**LOCATION OF AIR QUALITY MONITORING STATION**

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Date

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Ground floor within the front gate of 83 Wo Ka Lau Road



Ground floor boundary wall of house 51D of Wo Hop Shek San Tsuen

**PROVISION OF CREMATORS AT WO HOP SHEK CREMATORIUM AT KIU TAU ROAD**  
**PHOTOS OF AIR QUALITY MONITORING STATION**

Figure No.

3

Rev.:

0

Scale

NTS

Date

2/10



*Appendix A*

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*Calibration Record of High-Volume TSP Sampler*

High-Volume TSP Sampler  
5-Point Calibration Record

Location : A1 (Fanling)  
Calibrated by : P.F.Yeung  
Date : 7/3/2010

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 0143

Calibration Office and Standard Calibration Relationship

Serial Number : 9833620  
Service Date : 18 May 2009  
Slope (m) : 1.97702  
Intercept (b) : -0.00070  
Correlation Coefficient(r) : 0.99992

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1015  
Ta(K) : 295

Zero Error of Sampler Flow Rate Indication

IO : 0.0

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.7	3.548	1.795	60	59.7
2	13 holes	10.0	3.148	1.593	52	51.8
3	10 holes	8.1	2.833	1.434	46	45.8
4	7 holes	5.0	2.226	1.126	34	33.8
5	5 holes	3.1	1.753	0.887	23	22.9

Sampler Calibration Relationship

Slope(m):40.198 Intercept(b): -12.138 Correlation Coefficient(r): 0.9994

Checked by: Magnum Fan

Date: 8/03/2010



High-Volume TSP Sampler  
5-Point Calibration Record

Location : A1 (Fanling)  
Calibrated by : P.F.Yeung  
Date : 7/5/2010

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 0143

Calibration Office and Standard Calibration Relationship

Serial Number : 9833620  
Service Date : 18 May 2009  
Slope (m) : 1.97702  
Intercept (b) : -0.00070  
Correlation Coefficient(r) : 0.99992

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010  
Ta(K) : 296

Zero Error of Sampler Flow Rate Indication

IO : 0.0

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.8	3.290	1.664	62	62.6
2	13 holes	8.7	2.952	1.494	55	55.1
3	10 holes	6.7	2.591	1.311	48	48.0
4	7 holes	4.2	2.052	1.038	36	36.0
5	5 holes	2.5	1.583	0.801	26	26.0

Sampler Calibration Relationship

Slope(m): 41.814 Intercept(b): -7.306 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan

Date: 10/5/2010

High-Volume TSP Sampler  
5-Point Calibration Record

Location : A1 (Fanling)  
Calibrated by : P.F.Yeung  
Date : 7/7/2010

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 0143

Calibration Office and Standard Calibration Relationship

Serial Number : 1785  
Service Date : 10 May 2010  
Slope (m) : 2.01637  
Intercept (b) : -0.02316  
Correlation Coefficient(r) : 0.99996

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1006  
Ta(K) : 302

Zero Error of Sampler Flow Rate Indication

IO : 0.0

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.4	3.190	1.594	62	61.3
2	13 holes	8.3	2.850	1.425	54	53.4
3	10 holes	6.3	2.483	1.243	46	45.5
4	7 holes	3.6	1.877	0.942	32	31.7
5	5 holes	2.4	1.533	0.772	24	23.7

Sampler Calibration Relationship

Slope(m):45.590 Intercept(b): -11.352 Correlation Coefficient(r): 0.9999

Checked by: Magnum Fan

Date: 10/7/2010

High-Volume TSP Sampler  
5-Point Calibration Record

Location : A2, Fanling  
Calibrated by : P.F. Yeung  
Date : 7/03/2010

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1068

Calibration Office and Standard Calibration Relationship

Serial Number : 9833620  
Service Date : 18 May 2009  
Slope (m) : 1.97702  
Intercept (b) : -0.00070  
Correlation Coefficient(r) : 0.99992

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1015  
Ta(K) : 295

Zero Error of Sampler Flow Rate Indication

IO : 0.0

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (indicated flow)	Y
1	18 holes	12.2	3.477	1.758	68	67.9
2	13 holes	9.6	3.085	1.562	60	59.7
3	10 holes	7.8	2.780	1.410	52	51.8
4	7 holes	4.9	2.204	1.122	40	39.8
5	5 holes	2.9	1.695	0.868	28	27.9

Sampler Calibration Relationship

Slope(m): 44.784 Intercept(b): -10.794 Correlation Coefficient(r): 0.9996

Checked by: Magnum Fan

Date: 8/03/2010

High-Volume TSP Sampler  
5-Point Calibration Record

Location : A2, Fanling  
Calibrated by : P.F.Yeung  
Date : 7/05/2010

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1068

Calibration Orifice and Standard Calibration Relationship

Serial Number : 9833620  
Service Date : 18 May 2009  
Slope (m) : 1.97702  
Intercept (b) : -0.00070  
Correlation Coefficient(r) : 0.99992

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010  
Ta(K) : 296

Zero Error of Sampler Flow Rate Indication

IO : 0.0

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (indicated flow)	Y
1 18 holes	11.0	3.320	1.680	62	62.1
2 13 holes	8.8	2.969	1.502	55	55.1
3 10 holes	6.5	2.552	1.291	47	47.0
4 7 holes	4.2	2.051	1.038	36	36.0
5 5 holes	2.5	1.583	0.801	26	26.0

Sampler Calibration Relationship

Slope(m): 44.784 Intercept(b): -10.794 Correlation Coefficient(r): 0.9996

Checked by: Magnum Fan

Date: 10/05/2010

High-Volume TSP Sampler  
5-Point Calibration Record

Location : A2, Fanling  
Calibrated by : P.F.Yeung  
Date : 7/7/2010

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1068

Calibration Office and Standard Calibration Relationship

Serial Number : 1785  
Service Date : 10 May 2010  
Slope (m) : 2.01637  
Intercept (b) : -0.02316  
Correlation Coefficient(r) : 0.99996

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1006  
Ta(K) : 302

Zero Error of Sampler Flow Rate Indication

IO : 0.0

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (indicated flow)	Y
1	18 holes	7.0	2.617	1.310	42	41.6
2	13 holes	5.5	2.320	1.162	36	35.6
3	10 holes	4.4	2.075	1.041	30	29.7
4	7 holes	2.3	1.500	0.756	18	17.8
5	5 holes	1.5	1.212	0.612	12	11.9

Sampler Calibration Relationship

Slope(m): 42.785 Intercept(b): -14.455 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan

Date: 10/07/2010

*Appendix B*

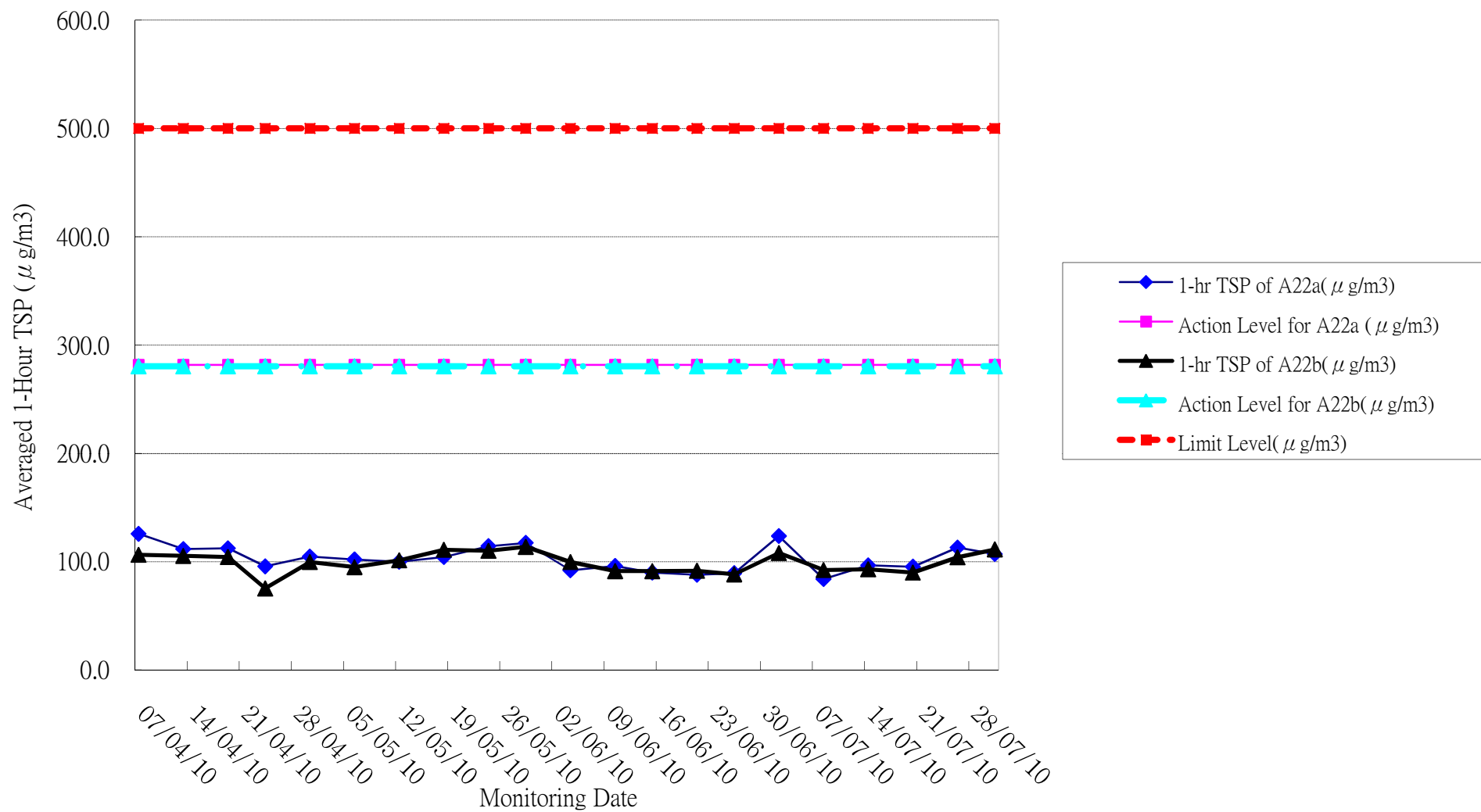
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*Summary and Graphical Plot of 1-Hour TSP  
Monitoring Record*

**Impact Monitoring for reprovisioning of cremators in Wo Hop Shek Crematorium****Air Quality Monitoring: 1-hour TSP****Month: May - July 2010**

Date	1-hr TSP of A22a( $\mu\text{g}/\text{m}^3$ )	Action Level for A22a ( $\mu\text{g}/\text{m}^3$ )	1-hr TSP of A22b( $\mu\text{g}/\text{m}^3$ )	Action Level for A22b( $\mu\text{g}/\text{m}^3$ )	Limit Level( $\mu\text{g}/\text{m}^3$ )
06/05/10	102.0	281.7	95.0	280.4	500.0
12/05/10	100.0	281.7	101.3	280.4	500.0
18/05/10	104.3	281.7	111.0	280.4	500.0
24/05/10	114.3	281.7	110.0	280.4	500.0
29/05/10	117.3	281.7	113.7	280.4	500.0
04/06/10	92.0	281.7	99.7	280.4	500.0
10/06/10	96.0	281.7	91.3	280.4	500.0
15/06/10	90.0	281.7	91.3	280.4	500.0
21/06/10	87.9	281.7	91.7	280.4	500.0
26/06/10	89.3	281.7	88.3	280.4	500.0
02/07/10	123.7	281.7	108.0	280.4	500.0
08/07/10	84.0	281.7	92.3	280.4	500.0
14/07/10	96.7	281.7	93.0	280.4	500.0
20/07/10	95.3	281.7	90.0	280.4	500.0
26/07/10	113.0	281.7	104.0	280.4	500.0
31/07/10	107.0	281.7	111.3	280.4	500.0

1-Hour TSP air quality monitoring data plot recorded at the designated monitoring points





*Appendix C*

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*Summary and Graphical Plot of 24-Hour TSP  
Monitoring Record*

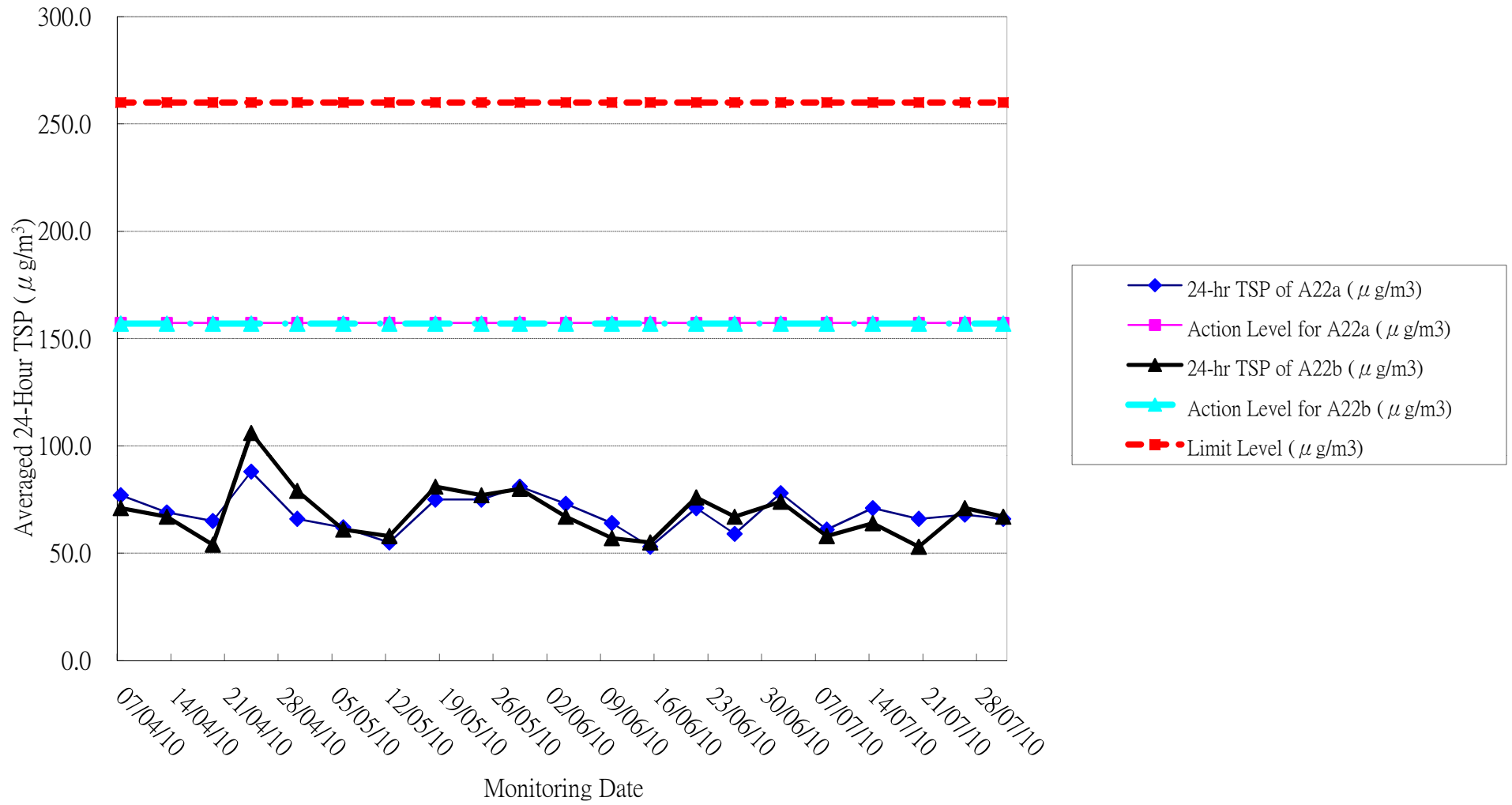
**Impact Monitoring for reprovisioning of cremators in Wo Hop Shek Crematorium**

**Air Quality Monitoring: 24-hour TSP**

**Month: May - July 2010**

Date	24-hr TSP of A22a (µg/m3)	Action Level for A22a (µg/m3)	24-hr TSP of A22b (µg/m3)	Action Level for A22b (µg/m3)	Limit Level (µg/m3)
06/05/10	62.0	157.3	61.0	157.0	260.0
12/05/10	55.0	157.3	58.0	157.0	260.0
18/05/10	75.0	157.3	81.0	157.0	260.0
24/05/10	75.0	157.3	77.0	157.0	260.0
29/05/10	81.0	157.3	80.0	157.0	260.0
04/06/10	73.0	157.3	67.0	157.0	260.0
10/06/10	64.0	157.3	57.0	157.0	260.0
15/06/10	53.0	157.3	55.0	157.0	260.0
21/06/10	71.0	157.3	76.0	157.0	260.0
26/06/10	59.0	157.3	67.0	157.0	260.0
02/07/10	78.0	157.3	74.0	157.0	260.0
08/07/10	61.0	157.3	58.0	157.0	260.0
14/07/10	71.0	157.3	64.0	157.0	260.0
20/07/10	66.0	157.3	53.0	157.0	260.0
26/07/10	68.0	157.3	71.0	157.0	260.0
31/07/10	66.0	157.3	67.0	157.0	260.0

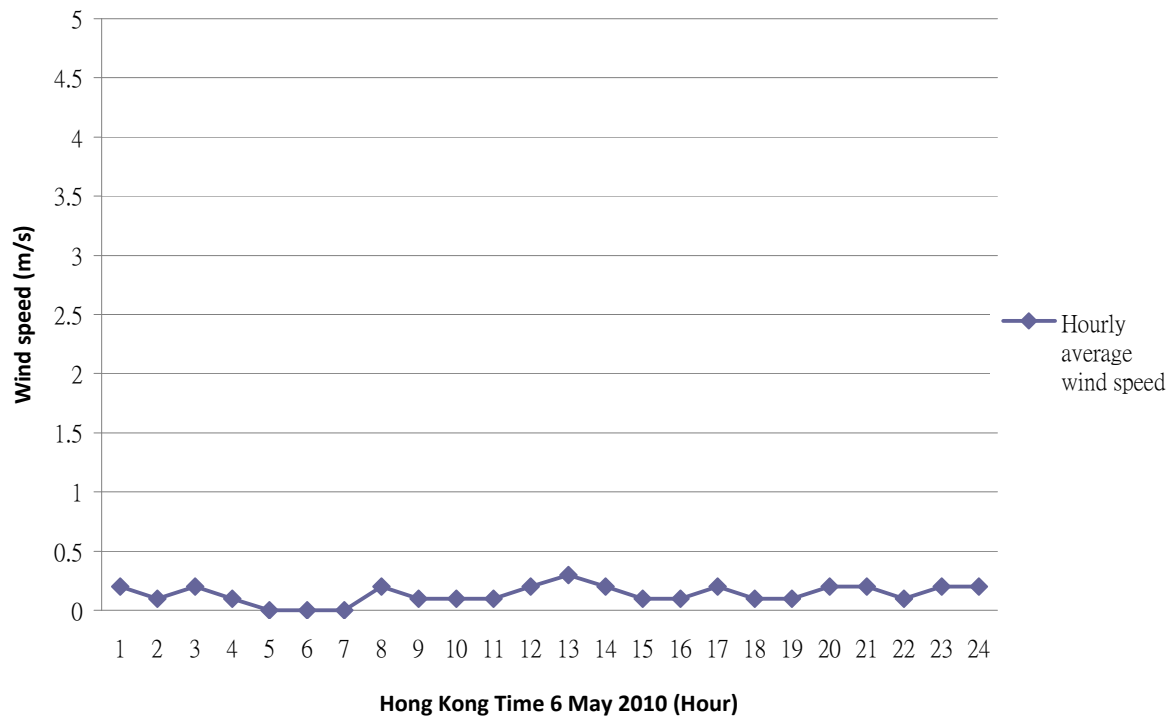
24-Hour TSP air quality monitoring data plot recorded at the designated monitoring points



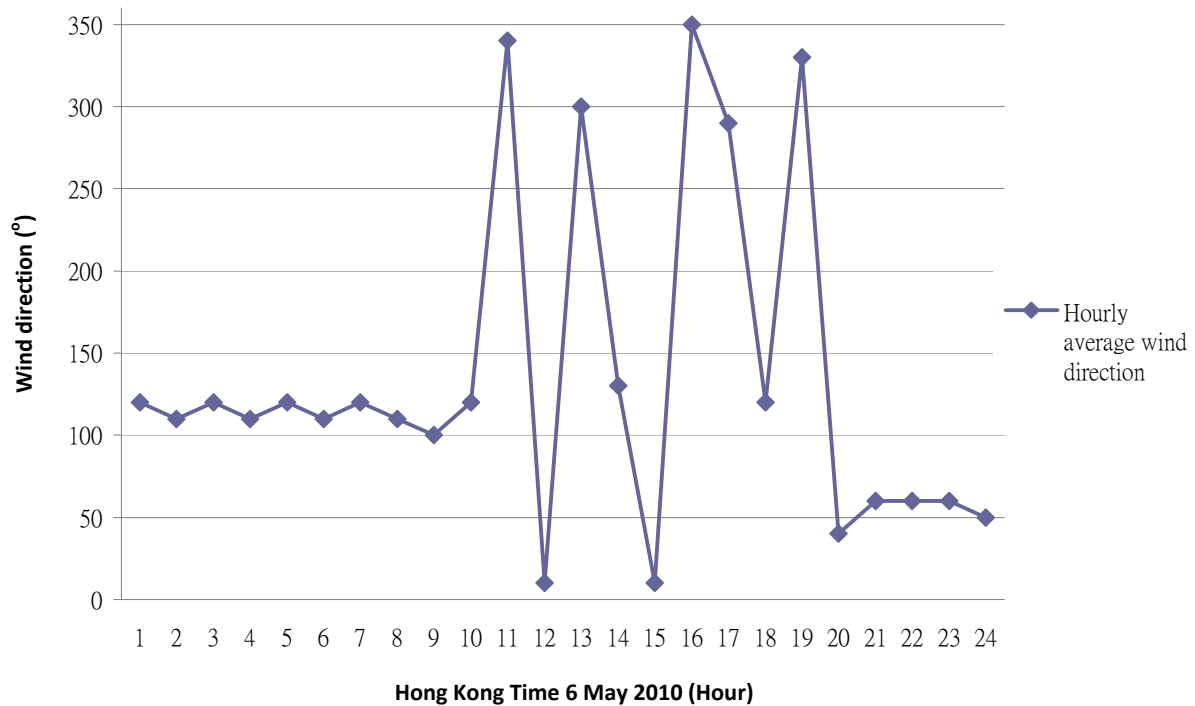
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*Appendix D*  
*Wind Record*

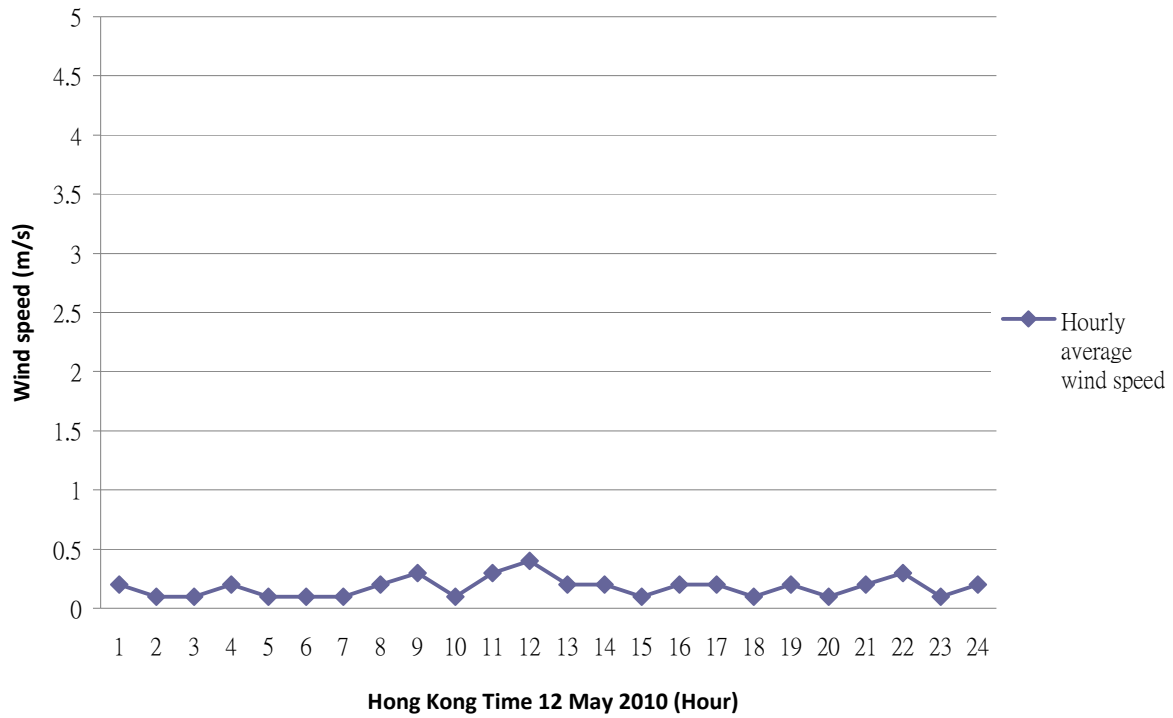
## Wind speed profile at on-site wind station



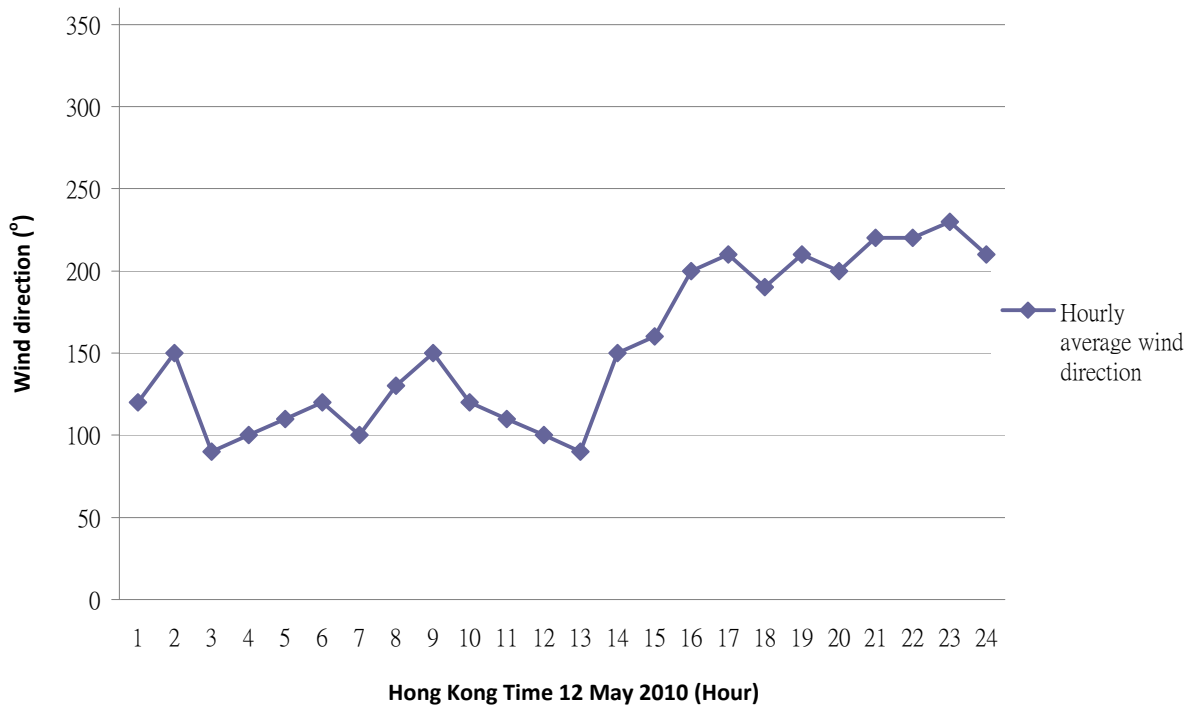
## Wind direction profile at on-site wind station



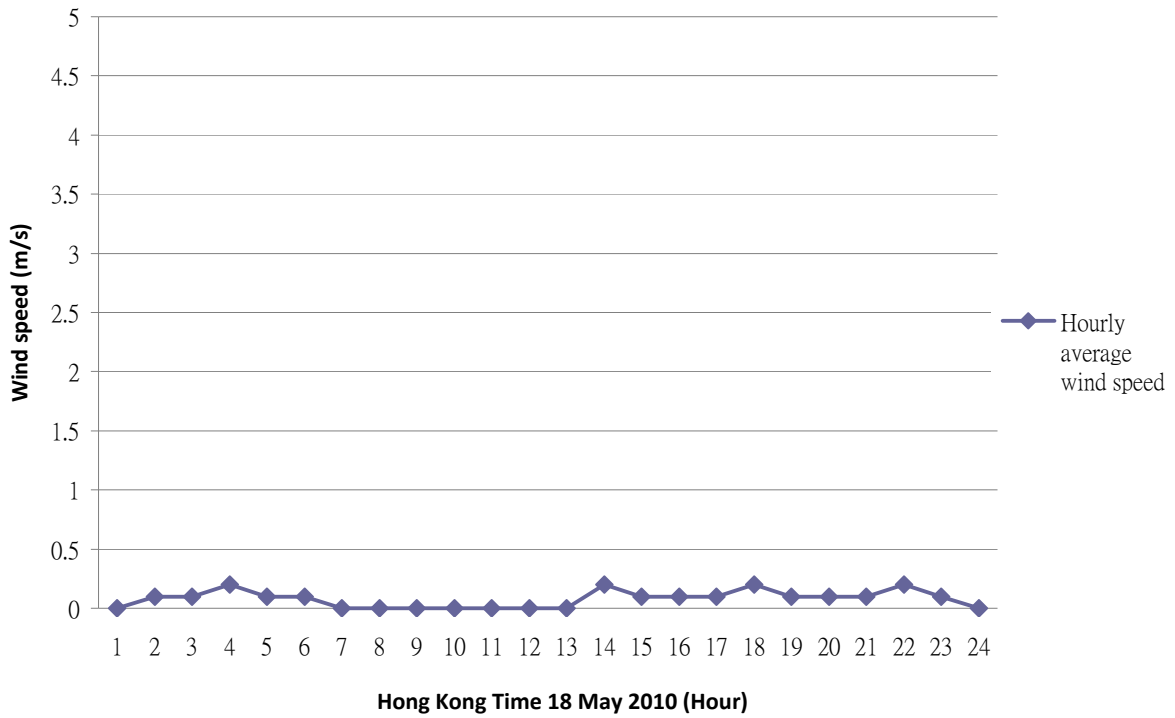
## Wind speed profile at on-site wind station



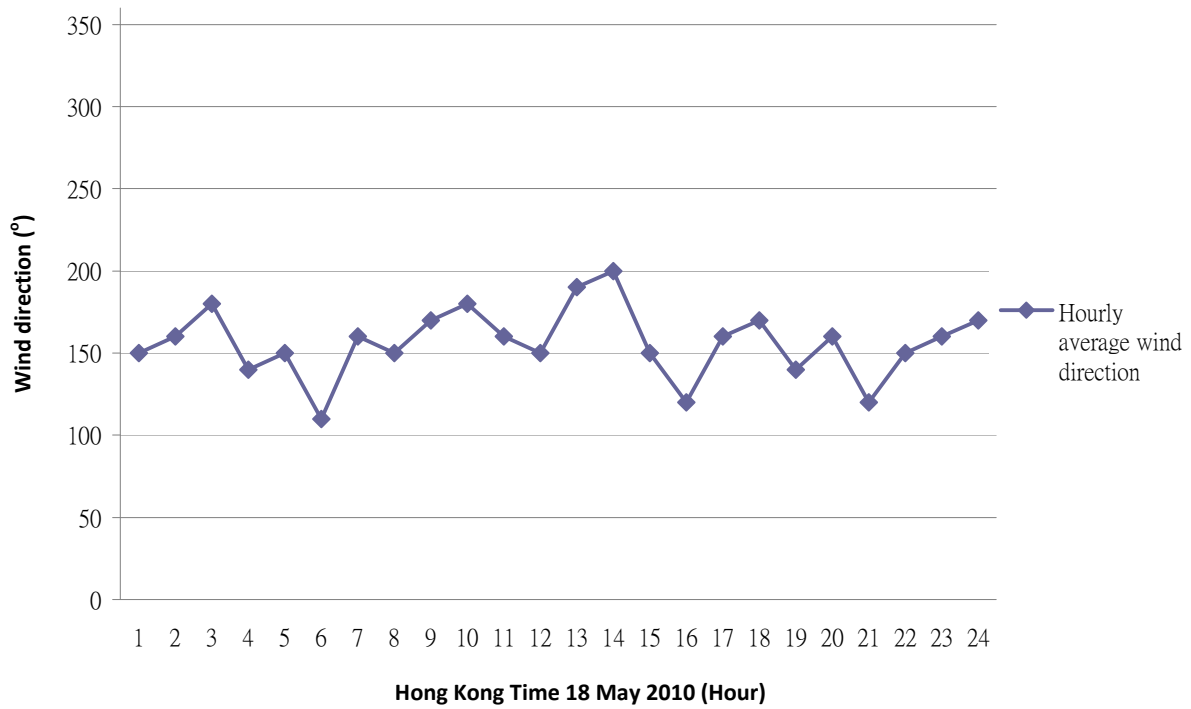
## Wind direction profile at on-site wind station



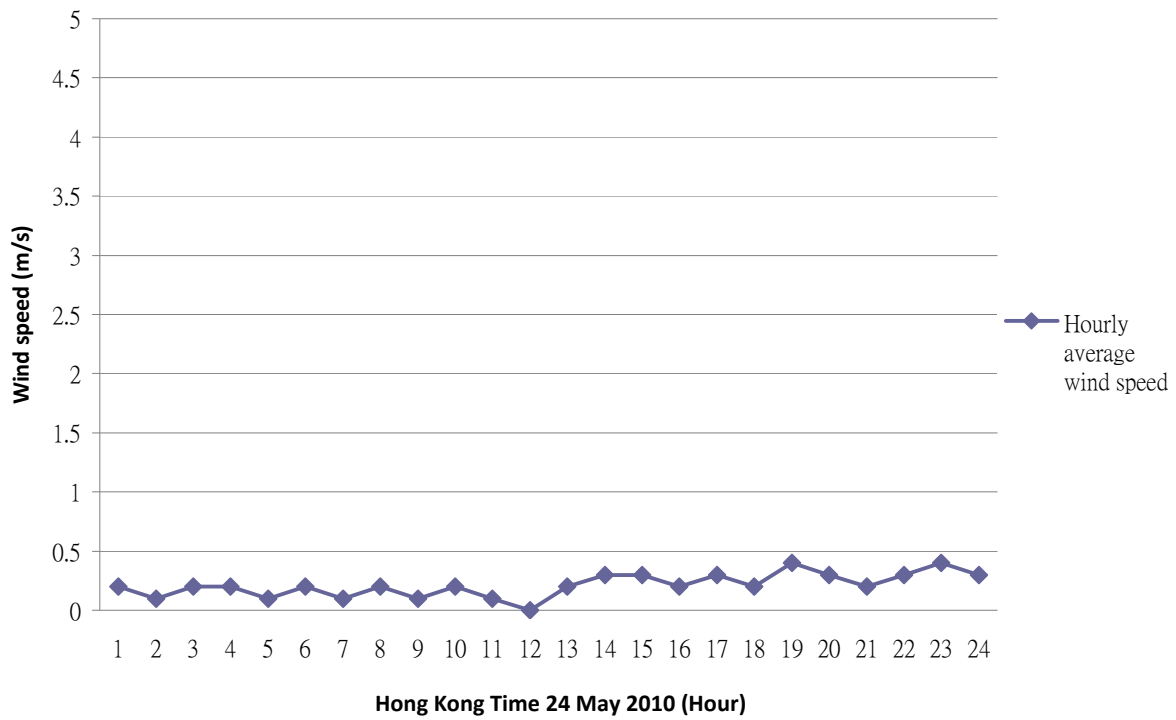
### Wind speed profile at on-site wind station



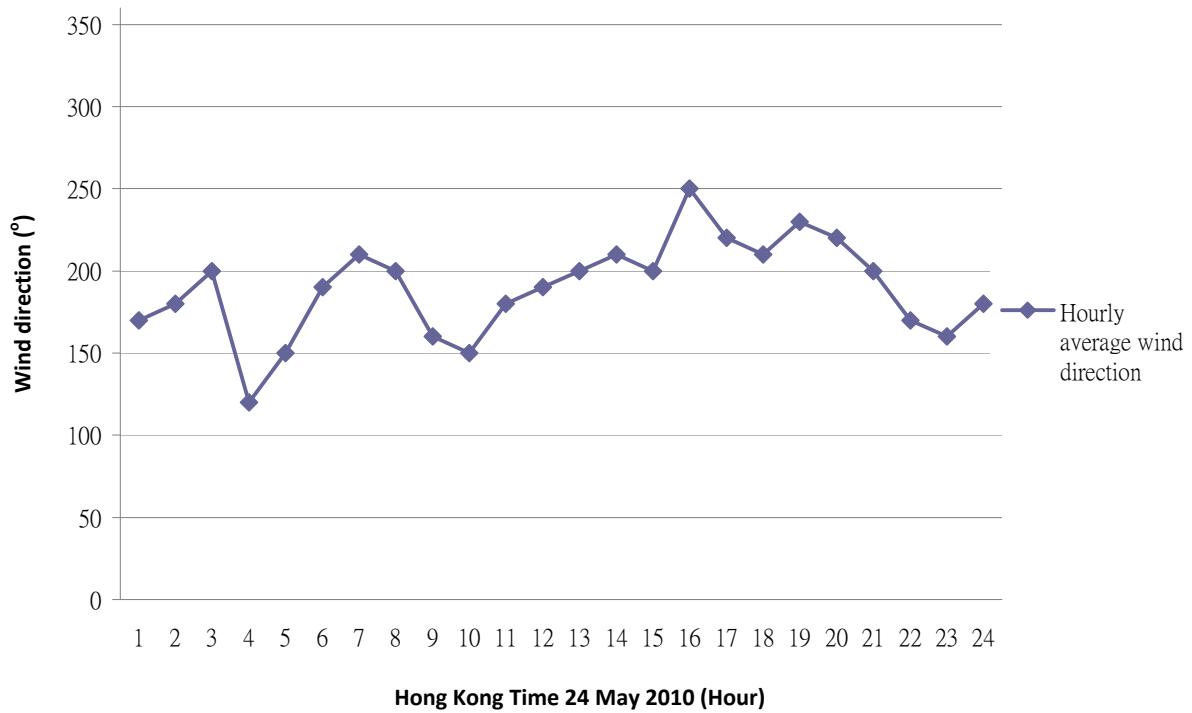
### Wind direction profile at on-site wind station



## Wind speed profile at on-site wind station

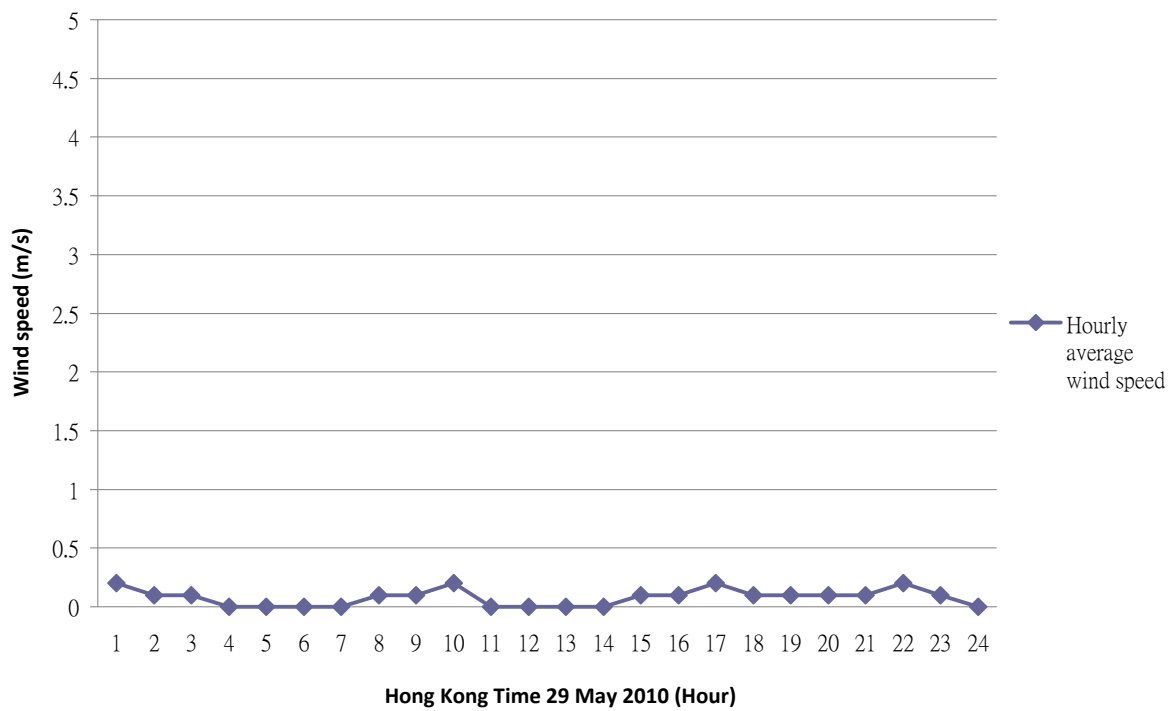


## Wind direction profile at on-site wind station

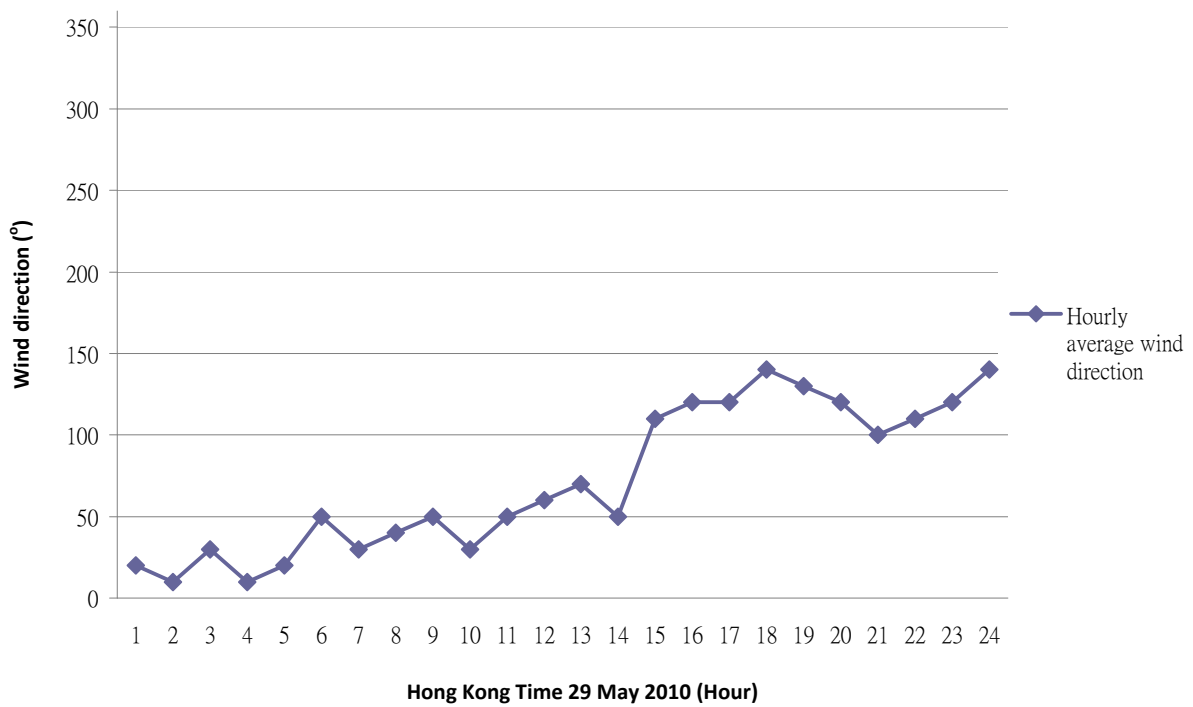




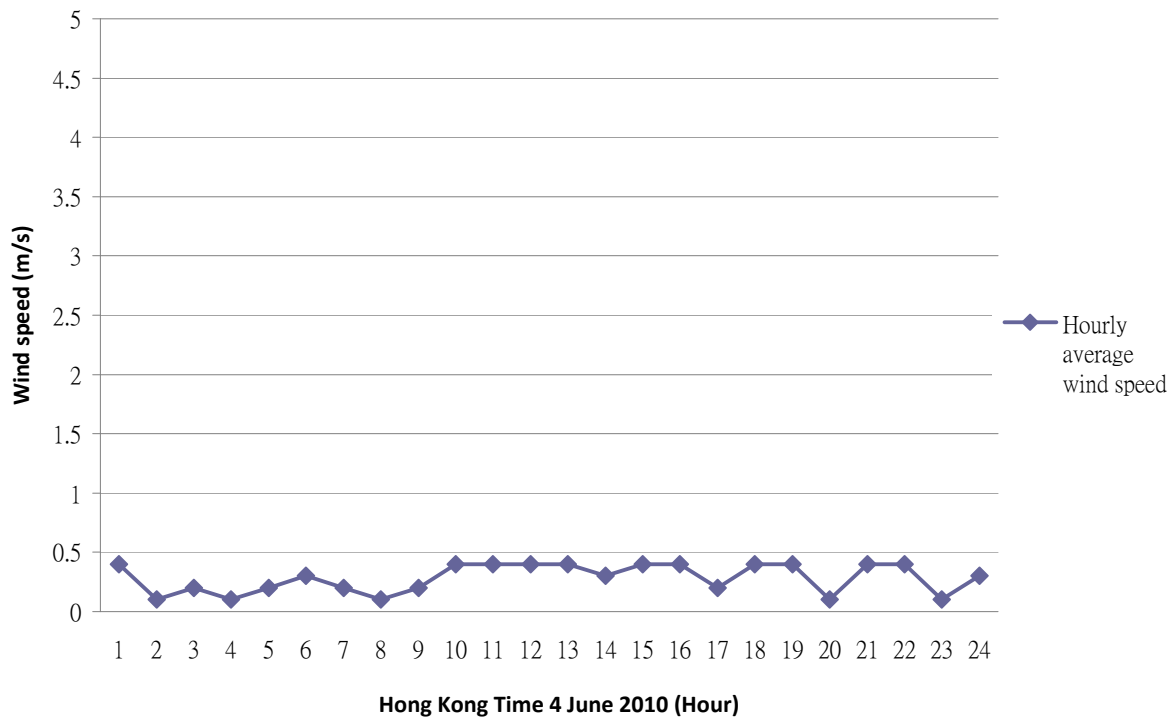
### Wind speed profile at on-site wind station



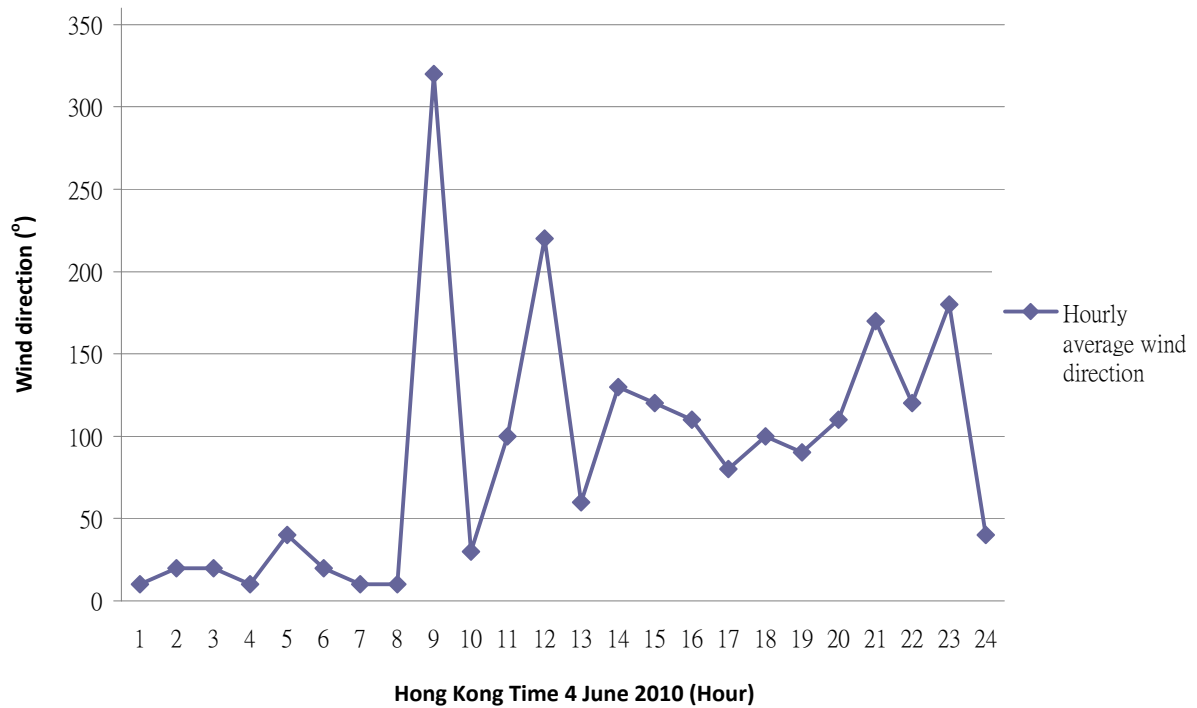
### Wind direction profile at on-site wind station



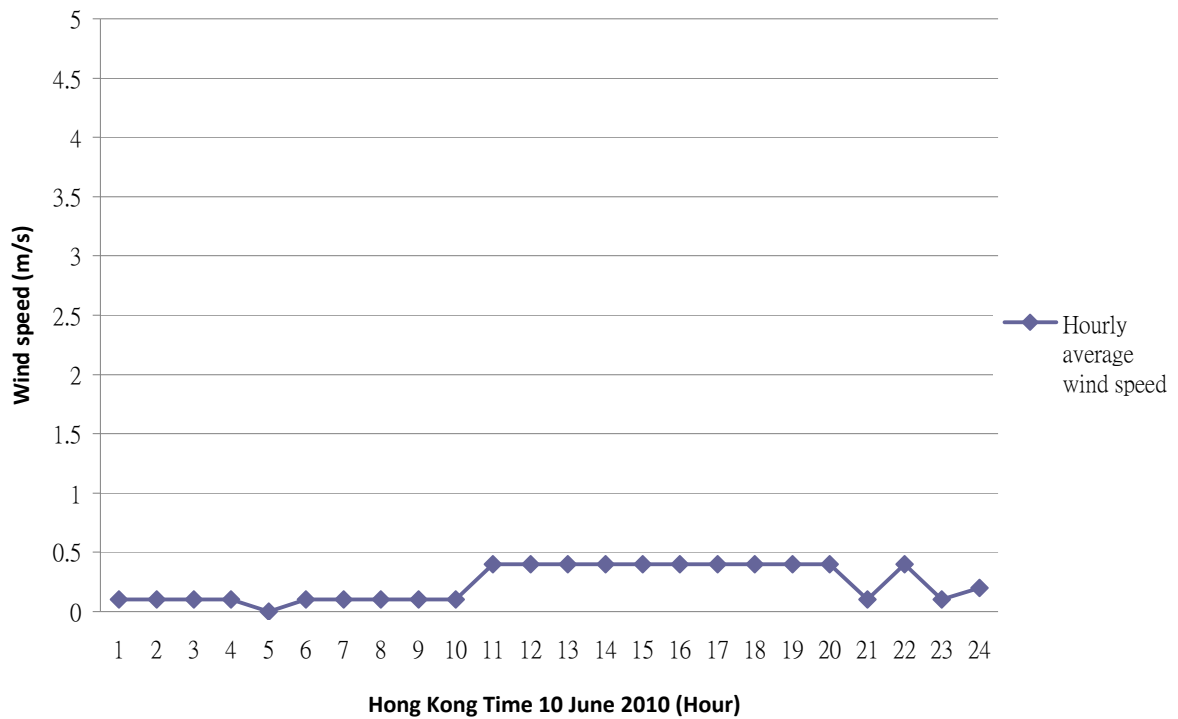
### Wind speed profile at on-site wind station



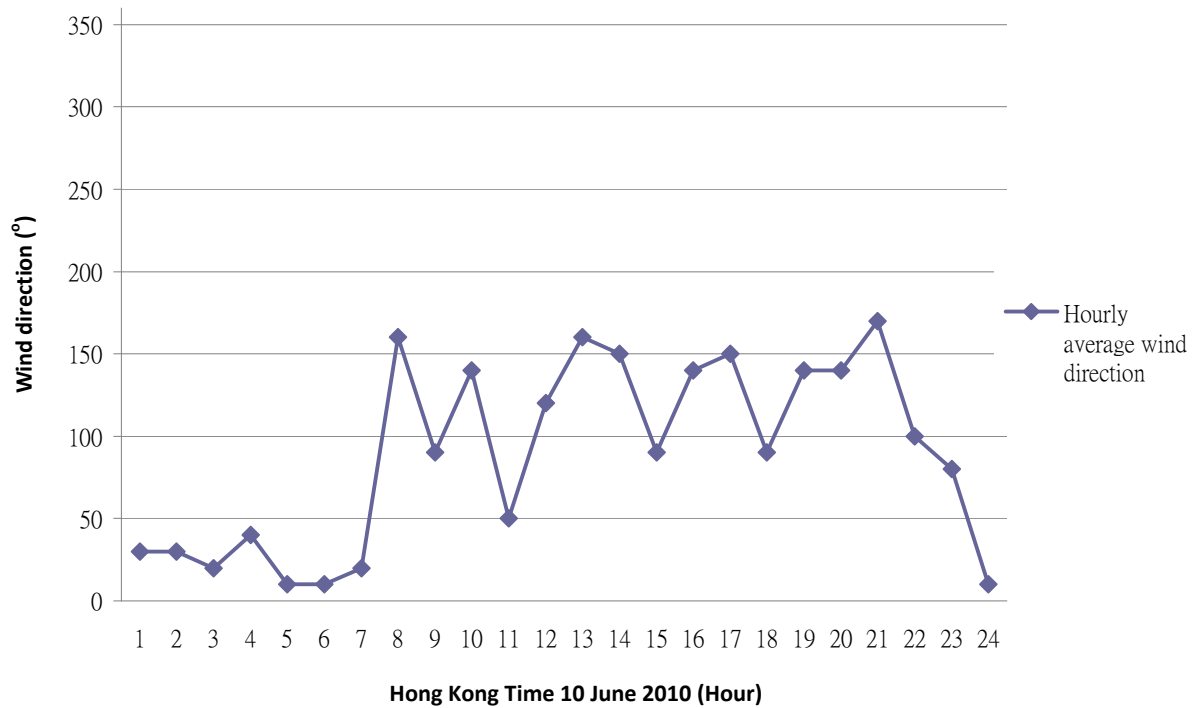
### Wind direction profile at on-site wind station



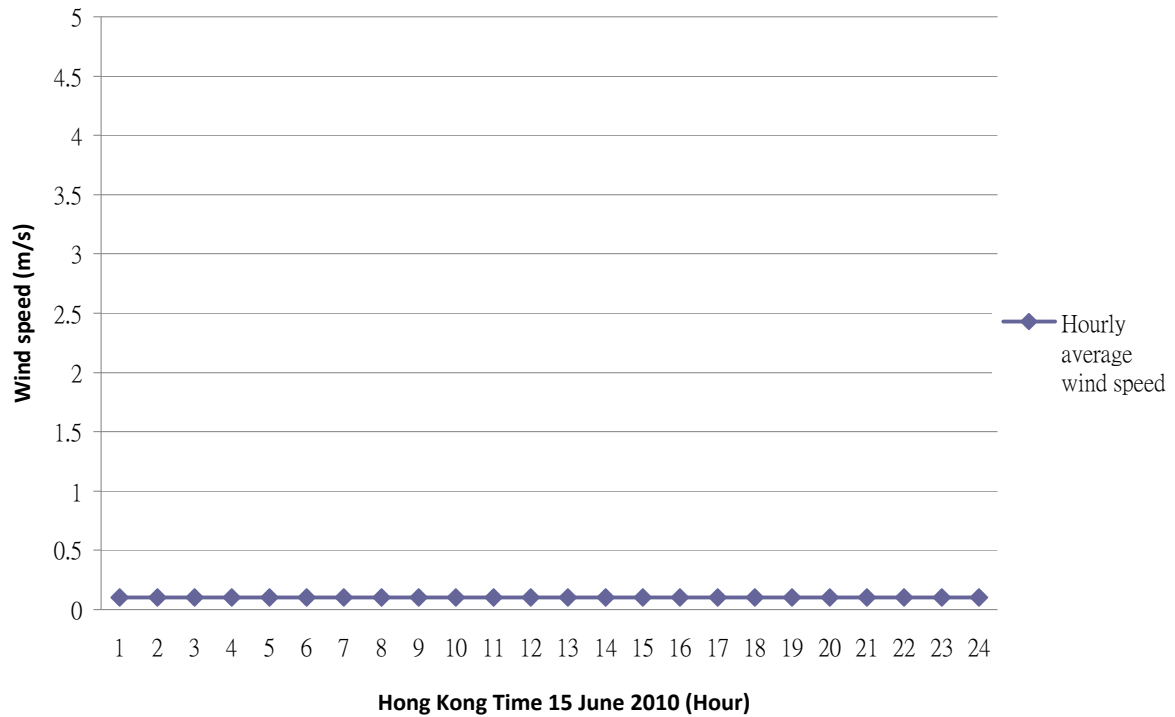
### Wind speed profile at on-site wind station



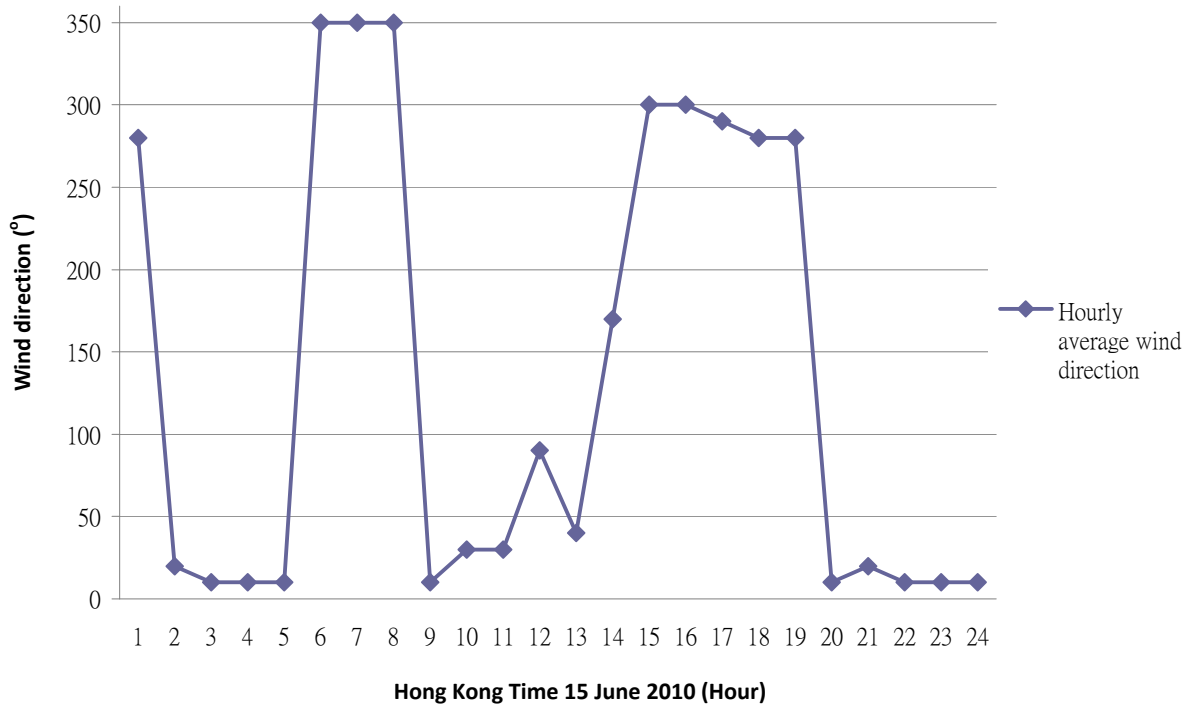
### Wind direction profile at on-site wind station



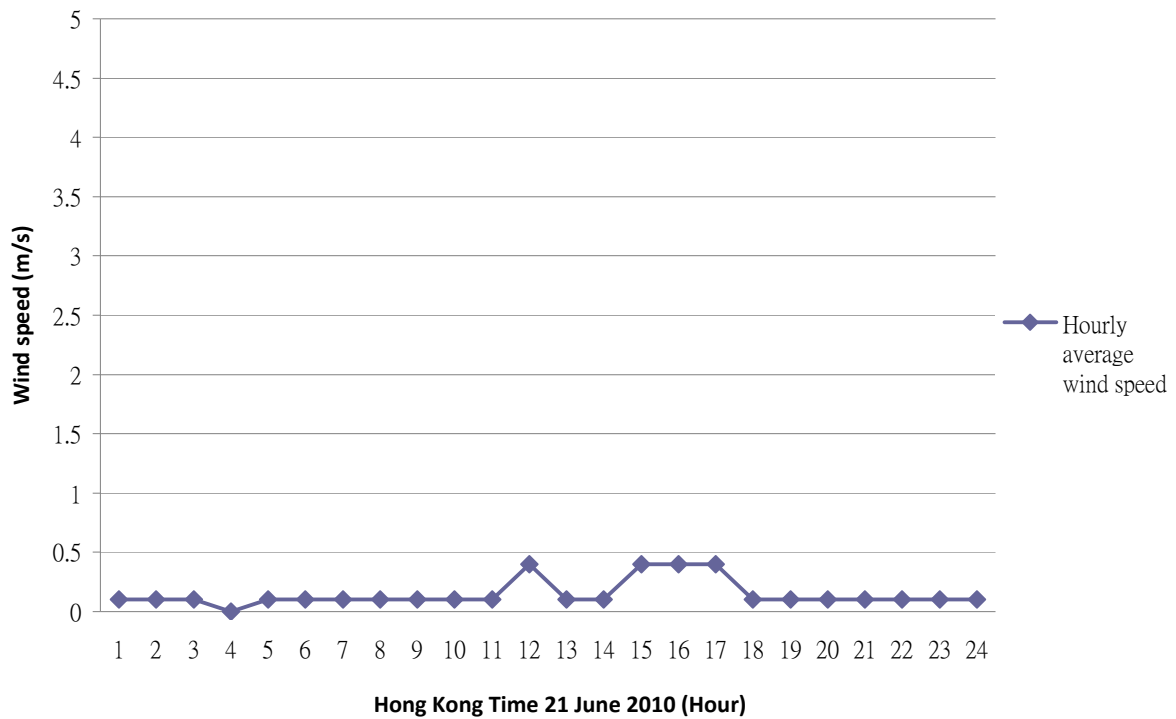
## Wind speed profile at on-site wind station



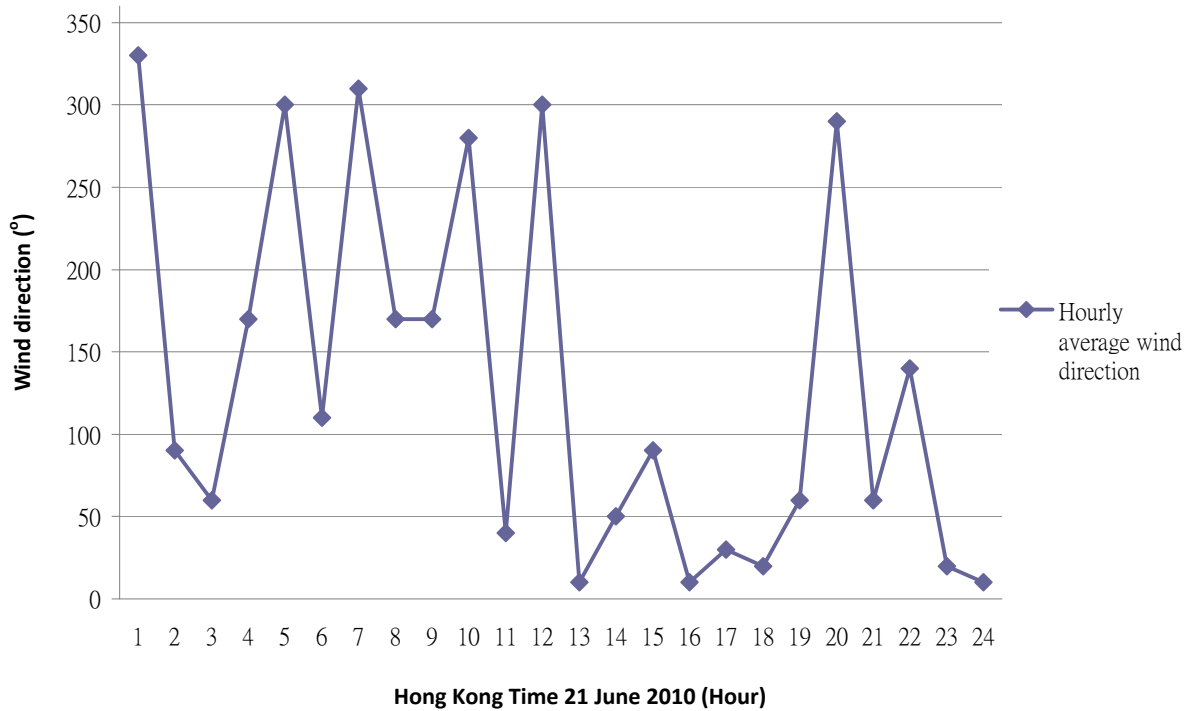
## Wind direction profile at on-site wind station



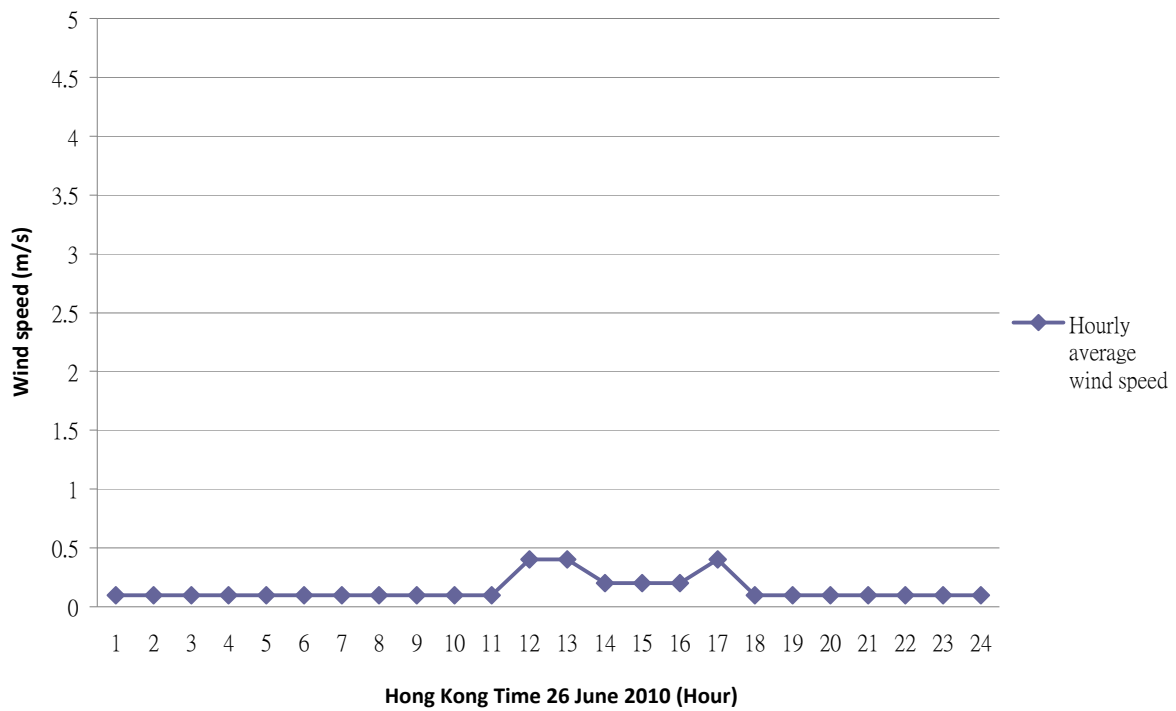
## Wind speed profile at on-site wind station



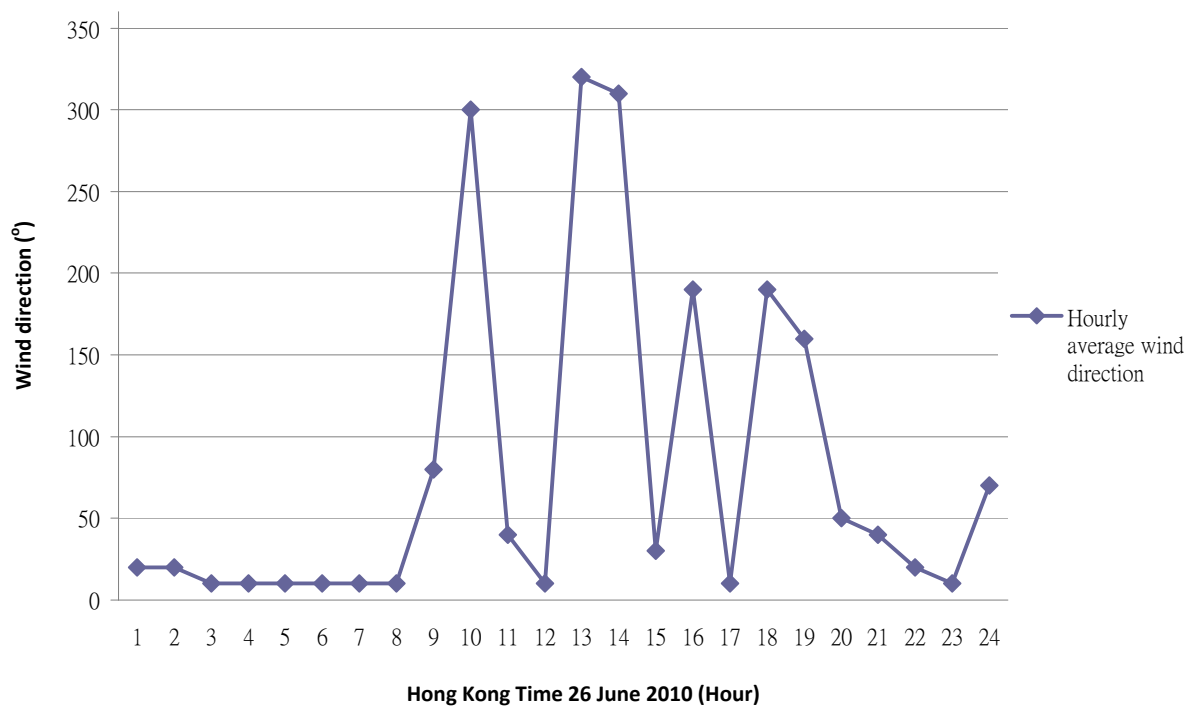
## Wind direction profile at on-site wind station



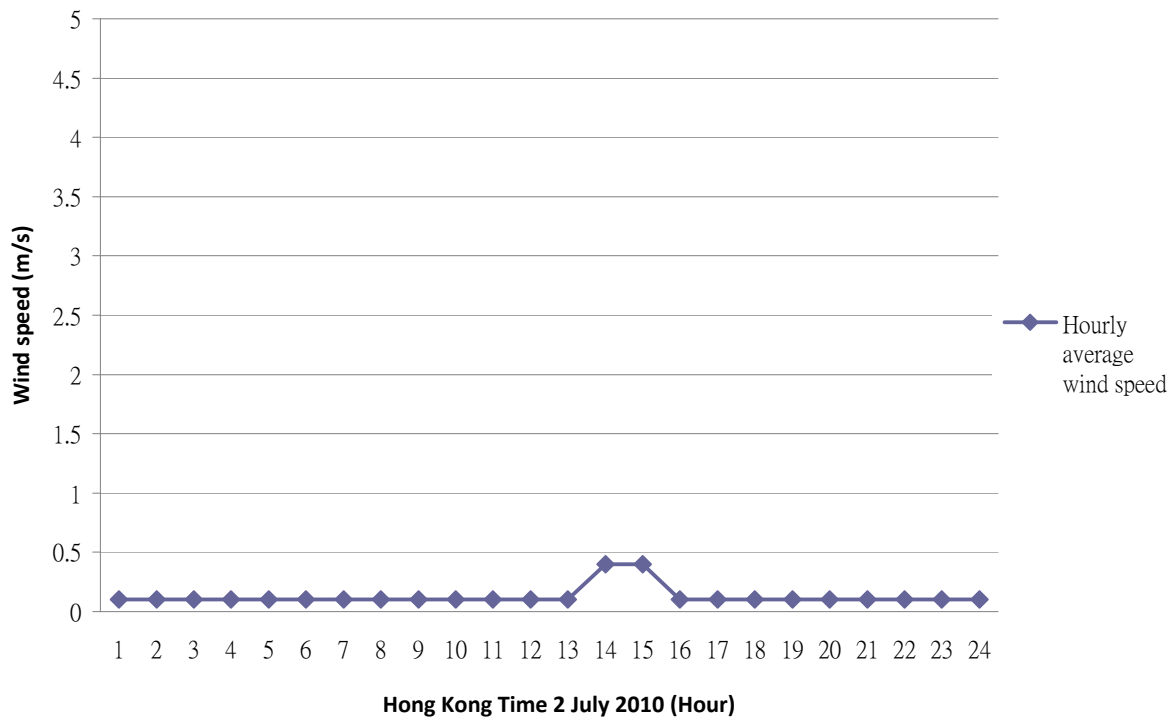
## Wind speed profile at on-site wind station



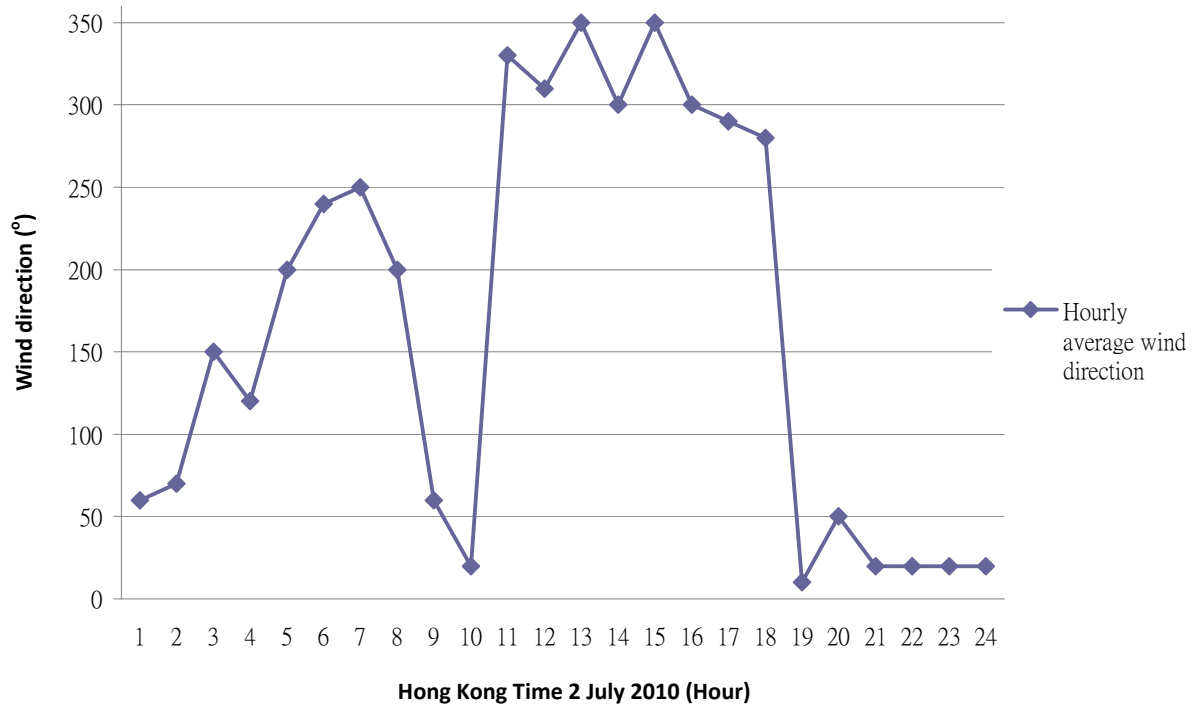
## Wind direction profile at on-site wind station



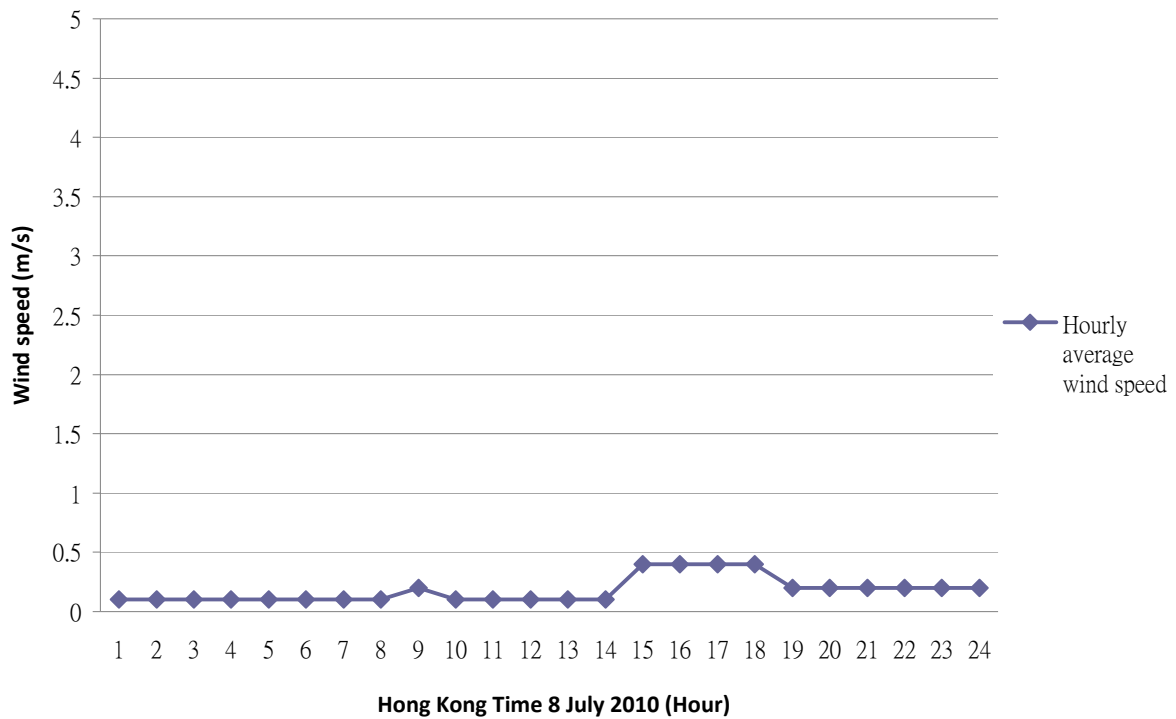
## Wind speed profile at on-site wind station



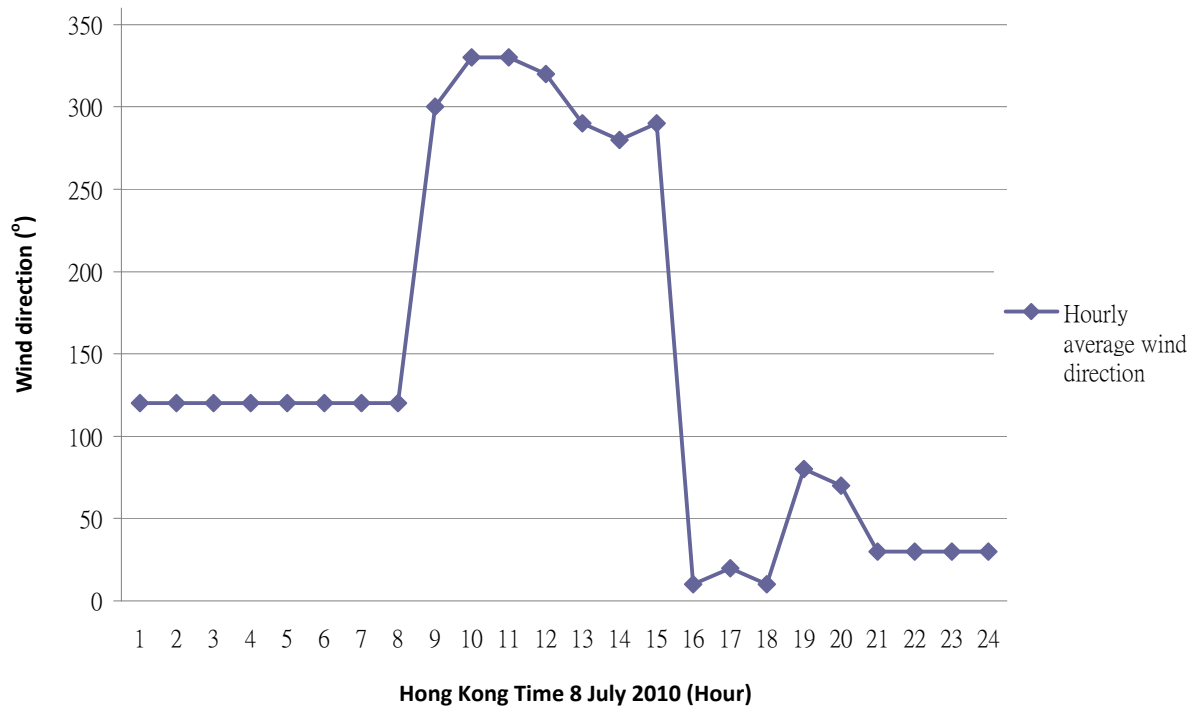
## Wind direction profile at on-site wind station



## Wind speed profile at on-site wind station

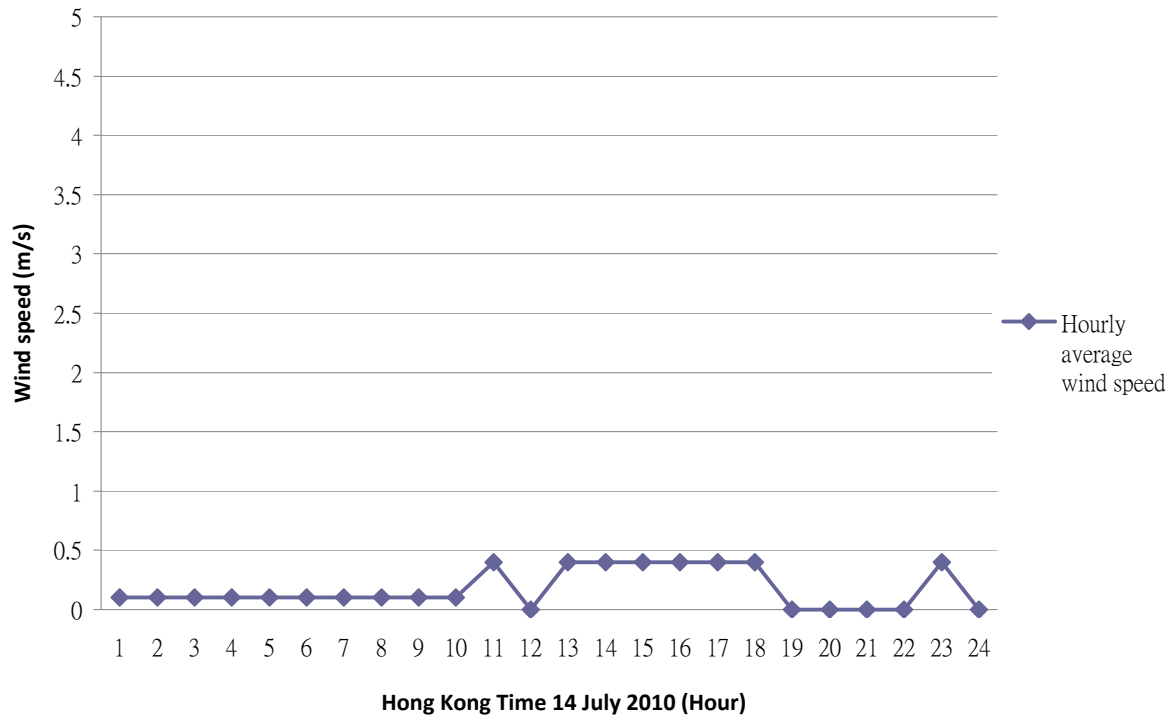


## Wind direction profile at on-site wind station

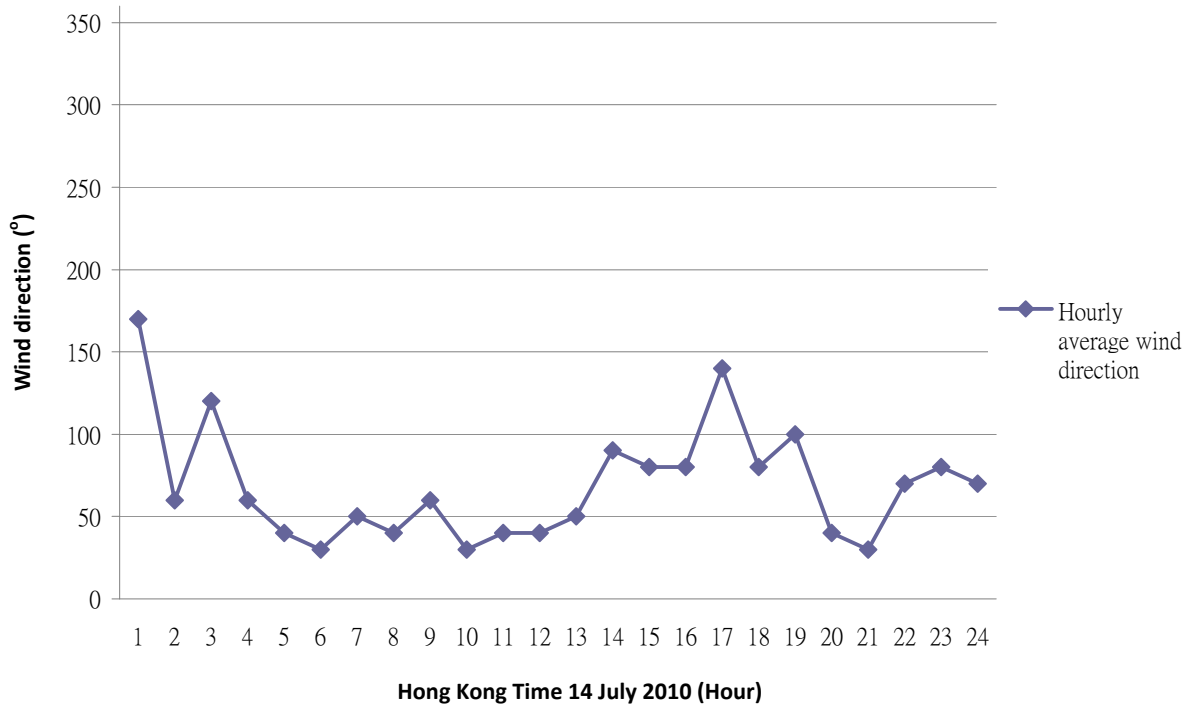




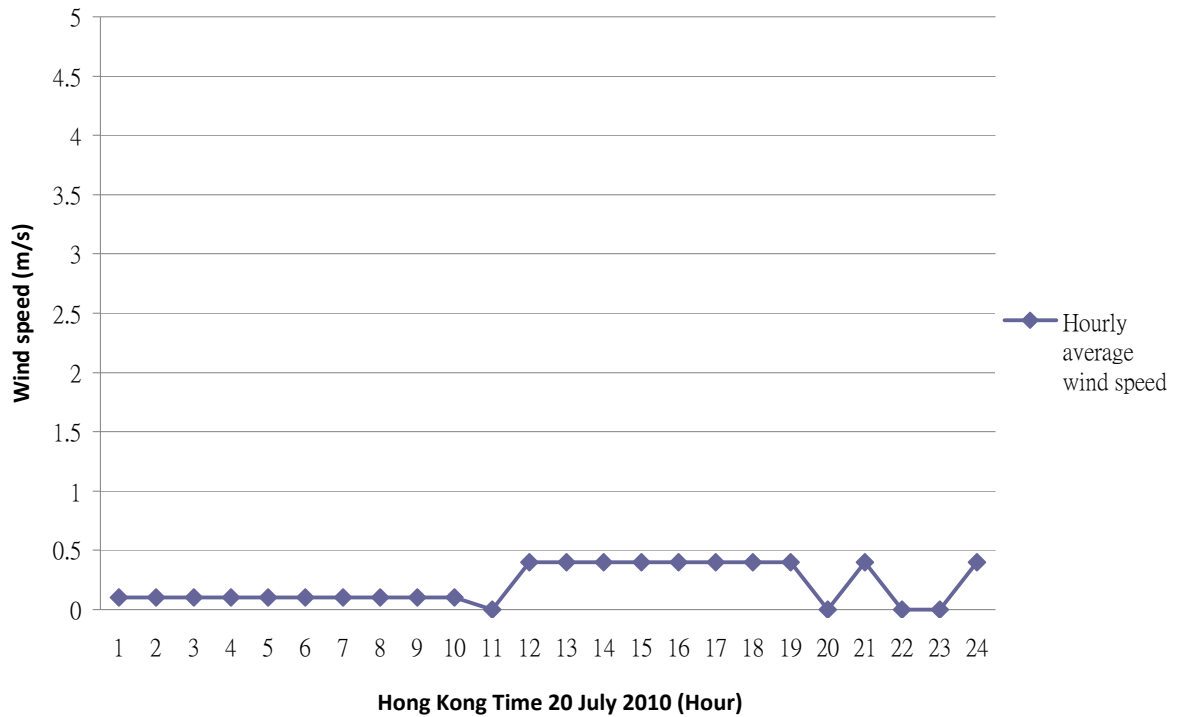
### Wind speed profile at on-site wind station



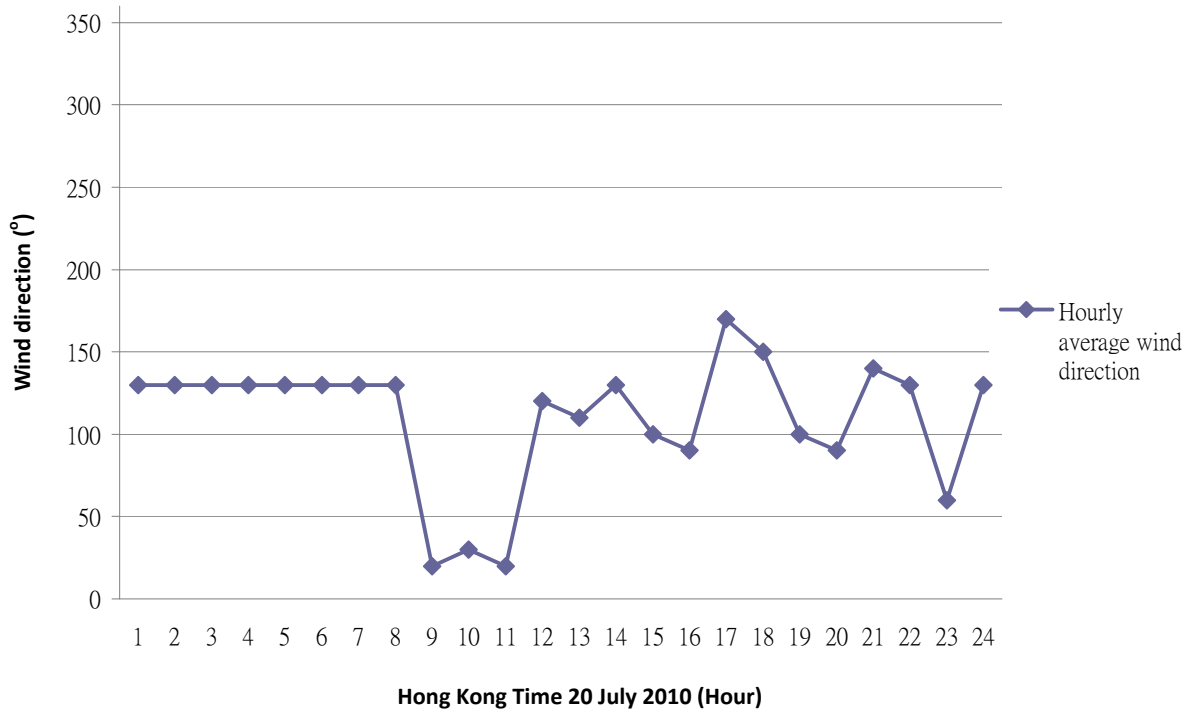
### Wind direction profile at on-site wind station



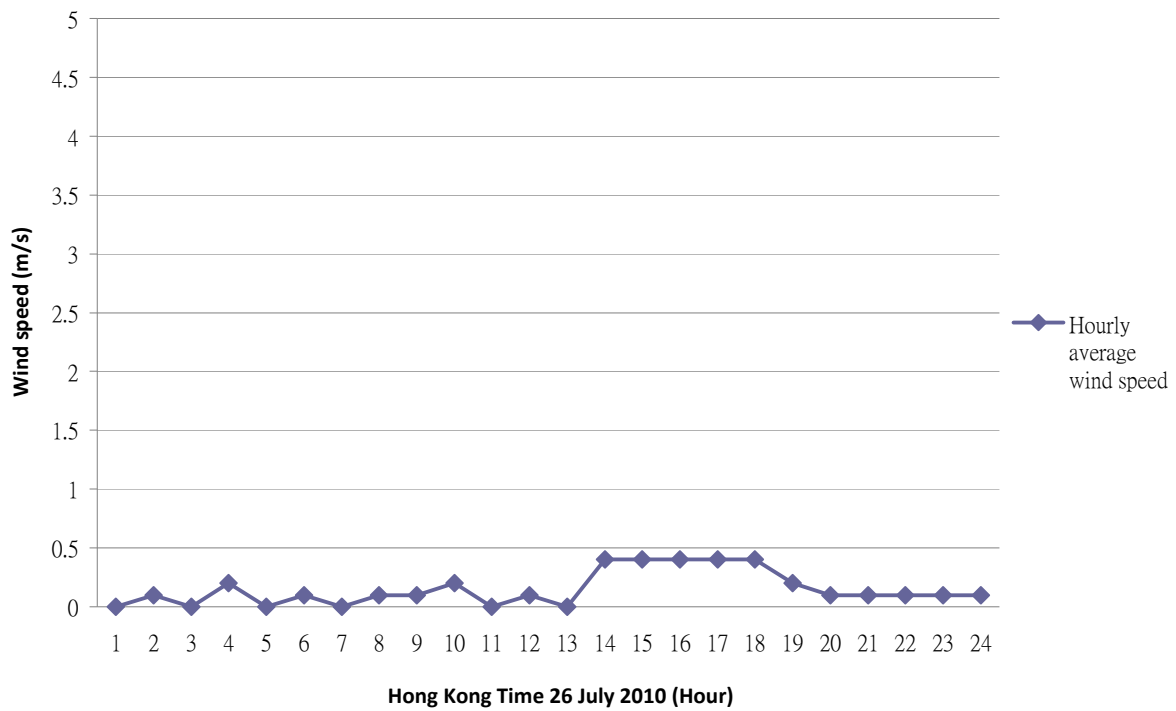
### Wind speed profile at on-site wind station



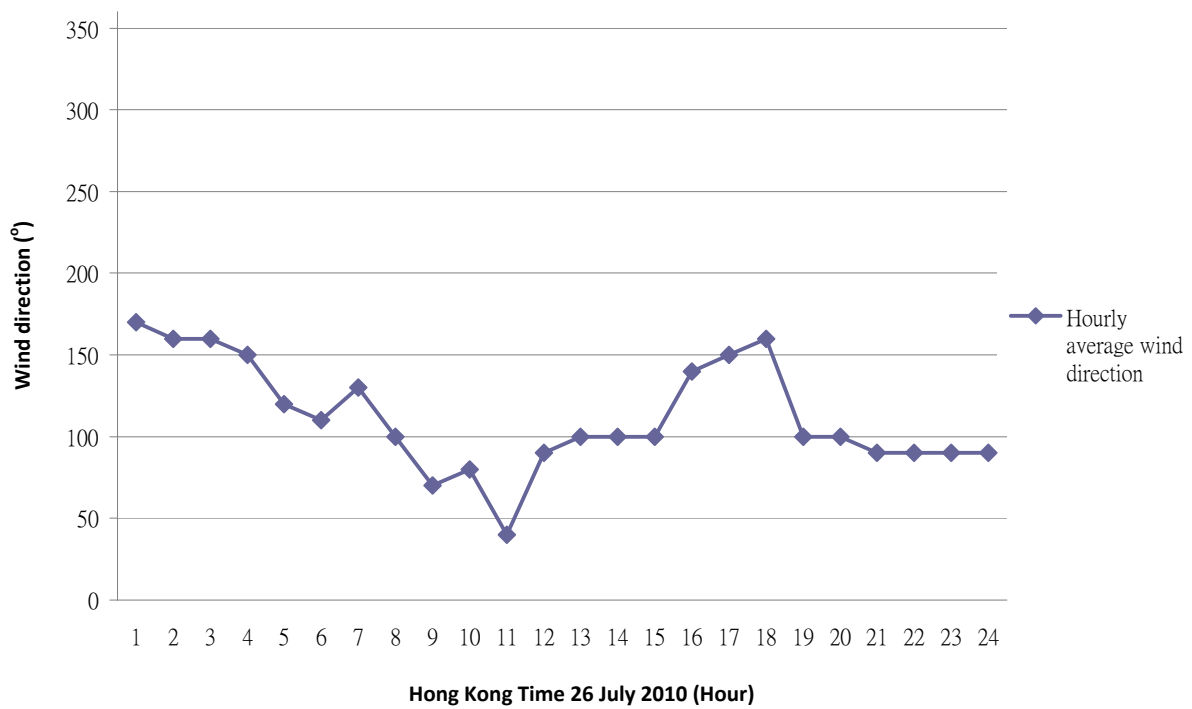
### Wind direction profile at on-site wind station



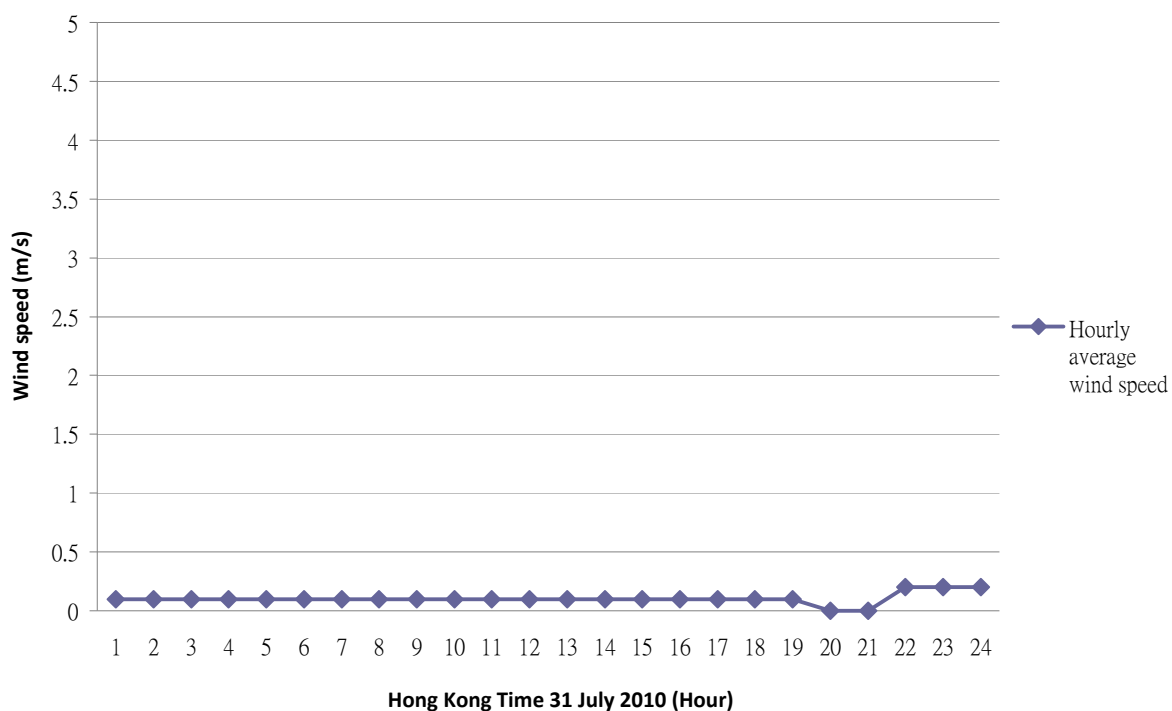
## Wind speed profile at on-site wind station



## Wind direction profile at on-site wind station



## Wind speed profile at on-site wind station



## Wind direction profile at on-site wind station

